



**BETTERHOMES
TAY VALLEY TOWNSHIP
ENERGY EFFICIENCY
RETROFIT PROGRAM DESIGN**

MAY 2022

ACKNOWLEDGMENTS

Funding for this report came from the Federation of Canadian Municipalities (FCM) Community Efficiency Financing (CEF) Studies stream. The CEF is a \$300 million fund provided by the Government of Canada to support Canadian municipalities to advance energy financing programs for low-rise residential properties. The CEF Studies stream provided funds to Clean Air Partnership to work with 7 Ontario municipalities to undertake their low-rise residential energy efficiency market analysis and program design.

CLEAN AIR PARTNERSHIP

Clean Air Partnership (CAP) is a charitable environmental organization whose vision is that Canadian communities are sustainable, healthy and resilient. CAP was launched in 2000 to enable communities to improve air quality, advance active transportation, and take bold climate action. CAP serves as the facilitator for the Clean Air Council (CAC), which is a staff level network of over 35 municipalities and health units from across Ontario working collaboratively on the development and implementation of clean air, climate change, sustainability and resilience actions.

BETTERHOMES ONTARIO

BetterHomes Ontario was convened to meet the municipal need for a 3rd party retrofit program delivery partner. It is a joint program of the Association of Municipalities of Ontario (AMO), Clean Air Partnership and Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI).

LIGHTSPARK

Lightspark empowers banks, cities and utilities to connect with homeowners to accelerate the transition to Net Zero. They do this through providing a data-rich enabling platform that gives homeowners a carbon and energy credit score and expert tools and recommendations to improve their home.

TAY VALLEY TOWNSHIP

Clean Air Partnership would like to thank Noelle Reeve and Garry Welsh for their support in making the market analysis and retrofit program design for Tay Valley Township possible.

FOR MORE INFORMATION, CONTACT

Clean Air Partnership,
75 Elizabeth Street, Toronto, Ontario M5G 1P4, Canada
www.cleanairpartnership.org
cap@cleanairpartnership.org

TABLE OF CONTENTS

ACKNOWLEDGMENTS	2
Executive Summary	4
Part 1: Program Rationale and Background.....	5
Program Need	5
Program Opportunity	11
BetterHomes Tay Valley Township.....	13
BetterHomes Ontario	14
Part 2: Retrofit Market Analysis.....	15
Residential Archetypes	15
Energy Burden By Archetype.....	20
Part 3: Program Design.....	22
Financing	25
Administration	25
Homeowner Supports.....	27
Incentive Management.....	27
Contractor Engagement and Training	28
Loan Loss Reserve	29
Participant Verification.....	29
Part 4: FCM Funding Application.....	30
Proposal Development	30
Risk and Risk Mitigation	31
Program Scale-Up.....	32
Program Budget	33
Tay Valley Township Decision Points	35
Appendix: Tay Valley Township 's Market and Housing Archetype Analysis.....	36

EXECUTIVE SUMMARY

Reducing the greenhouse gas emissions that cause climate change is a key priority for all orders of government in Canada. Provincially, the heating and cooling of the buildings we live, work and play in contributes about one quarter of all Ontario GHG emissions. Addressing emissions from residential buildings is challenging - we must design and implement energy efficiency retrofit programs that are attractive for homeowners, not overly burdensome for municipalities, and generate the emission reductions we badly need. Individual municipalities have difficulty securing the capital and start-up funds needed to develop these retrofit programs.

Responding to this need, the Federation of Canadian Municipalities created the Community Efficiency Financing Program, a \$300m fund capitalized by the Government of Canada. The Program has separate streams, one allowing for feasibility and design studies into energy efficiency programs, and another providing capital and grants to fund these programs based on the research established at the feasibility stage.

Tay Valley Township joined a feasibility study cohort of seven municipalities managed by Clean Air Partnership and delivered in conjunction with Huntsville, London, Barrie, Clarington, Kawartha Lakes, and Dufferin County. Part 2 of this Report details the findings of that feasibility study. Data from the feasibility study is then incorporated into an energy efficiency program design for BetterHomes Tay Valley Township, detailed in Part 3. The final section of this Report maps a pathway for a proposal to the Federation of Canadian Municipalities to capitalize a BetterHomes Tay Valley Township program.

Delivering BetterHomes Tay Valley Township would see Tay Valley Township outperform other communities without energy efficiency programs, resulting in job creation, local economic development, increased local energy efficiency expertise, reduced energy costs for homeowners, and a significant reduction in the emissions that cause climate change. In a world of turbulent energy prices, Tay Valley Township could dramatically reduce the number of households experiencing energy poverty, alleviating those living with a high energy cost burden. The community's building stock will improve, with better operating performance, increased asset values, healthier homes, and reduced vulnerability to increasing electricity, gas, oil, and propane costs.

Energy efficiency programs present a great opportunity for a community. We are thankful to be in a position where we have identified great potential for Tay Valley Township to act on this opportunity and have a matching funding window where we can capitalize that opportunity using federal funds. We very much look forward to working with the Tay Valley Township on a capital application to FCM should Council approve that and would enjoy the opportunity to respond to questions from Staff and Council as required.



Gabriella Kalapos, Executive Director, Clean Air Partnership

PART 1: PROGRAM RATIONALE AND BACKGROUND



For Tay Valley Township to meet its GHG reduction target, emissions from existing buildings will need to be reduced substantially.

Energy retrofit programs play a critical role in reaching the science based GHG reduction targets that are necessary to help avoid catastrophic climate change impacts.

Program Need

There is widespread recognition that climate change is significantly impacting communities around the world and affecting our infrastructure, food production, health and safety. The Intergovernmental Panel on Climate Change (IPCC) stated that limiting global temperature increases to 1.5°C above pre-industrial levels requires expedited and transformational changes to land use, energy, industry, buildings and transportation. The most recent IPCC report released in April 2022 stated that with options for holding global warming to 1.5°C quickly closing, countries must immediately phase down fossil fuel production, embrace practical and affordable low-carbon technologies, mobilize citizens around the benefits of decarbonization, and dramatically increase low-carbon financing. Municipalities are critical leaders in addressing this challenge.

In March of 2022, the Government of Canada introduced Canada's 2030 Emission Reduction Plan, which provides a roadmap for the Canadian economy to achieve a 40–45% emissions reductions below 2005 levels by 2030. In Ontario, buildings contribute 24% of total greenhouse gases (GHGs), following transportation (35%). Residential buildings in Tay Valley Township accounts for 13% of community GHG emissions, second only to the highest GHG emissions sector of on-road transportation at 80.5%.

Municipalities across the country are acknowledging that they must play a key role in tackling climate change in their jurisdictions. Hundreds of communities across Canada have passed Climate Emergencies and have developed (or are developing) climate action plans or community energy plans. Through climate actions such as building energy efficiency retrofit programs, municipalities can help their residents achieve climate commitments, while also reducing their vulnerabilities to energy and carbon price increases over time and increasing economic development and job creation within their communities.

Municipal climate mitigation plans across Canada commonly address their three main sources of GHGs: transportation, buildings, and waste. The buildings sector includes residential dwellings as well as commercial, industrial, and institutional facilities. For Tay Valley Township to meet its GHG reduction target, emissions from existing buildings will need to be reduced substantially. Energy retrofit programs play a critical role in reaching the science based GHG reduction targets that are necessary to help avoid catastrophic climate change



It is estimated that 75% of homes that will exist in 2030 are already built and 50% of existing homes will still be in place by 2050.

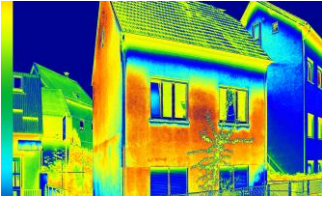
Space and water heating is the biggest user of energy in Canadian homes and accounts for approximately 80% of residential energy consumption and 95% of GHG emissions in Ontario homes.

impacts. This Report summarizes research and consultations undertaken to inform a potential Tay Valley Township residential energy efficiency retrofit program for the low-rise residential sector. It provides the rationale and opportunity for such a program (Part 1); a summary of the results of the market analysis undertaken to inform and quantify the retrofit opportunity (Part 2); the proposed design considerations (Part 3); and a summary of the decisions that Tay Valley Township would need to provide guidance on to determine next steps (Part 4).

The initial target market for this program is low-rise residential sector due to the focus of the Federation of Canadian Municipalities' Community Efficiency Financing (FCM CEF) program funded by a \$300 million contribution from the Government of Canada. The FCM CEF program supports municipalities to deliver community level residential energy efficiency financing programs to this underserved sector. This program can be augmented over time to serve other building archetypes (such as the multi-unit residential sector, rental properties and the commercial and industrial sectors). There will also be future opportunities to increase the measures that this program could advance (starting with energy efficiency, fuel-switching, renewables, EV charging, flood protection) and evolving into providing the necessary foundation that can cost-effectively advance other municipal policy goals (such as aging in place, secondary suites, etc.).

Municipalities have been advancing the energy performance of new buildings through their use of Green Standards that drive uptake to sustainability metrics such as energy performance. However, it is estimated that 75% of homes that will exist in 2030 are already built and 50% of existing homes will still be in place by 2050. Therefore, there is the ability and need for municipalities to advance community level retrofit programs within their existing building stock. This can be achieved by advancing programs that address barriers that limit uptake; and gaps in existing national (Greener Homes) and provincial demand side management (DSM) programs.

Many past energy conservation programs have focused on incremental improvements and standalone equipment discounts/rebates. Common examples of these programs are for light bulbs and household appliances such as clothes washers/dryers and dishwashers which typically use around 15% of a home's energy consumption. These programs have not yet advanced a more comprehensive deep energy retrofit approach that treats the home as a whole system, addressing space and water heating. Space and water heating is the biggest user of energy in Canadian homes and accounts for approximately 80% of residential energy consumption and over 95% of GHG emissions in Ontario homes.



Tay Valley Township can achieve GHG reductions, energy cost savings and economic development goals by advancing a residential energy efficiency retrofit program that targets building envelope and equipment improvements in homes with high energy costs and carbon reduction potential.

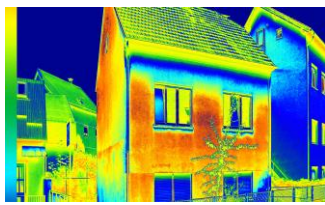
Tay Valley Township can achieve GHG reductions, energy cost savings and economic development goals by advancing a residential energy efficiency retrofit program that targets building envelope and equipment improvements in homes with high energy costs and carbon reduction potential. The proposed Tay Valley Township Program can, upon a successful FCM CEF proposal submission, bring energy efficiency and GHG reduction capital and grants into the municipality. It would increase the capacity of Tay Valley Township's contractor/renovator sector, and provide property owners access to expertise, financing, and incentives to implement energy efficiency upgrades within their homes. Loans will be paid back through property tax bills through the municipal Local Improvement Charge (LIC) mechanism.

This proposed Tay Valley Township program design includes several features that address noted barriers such as lack of upfront capital and knowledge of how to reduce home energy use. Home energy evaluations using the federal EnerGuide Rating System will determine the most effective retrofit measures based on the specific equipment, insulation levels and other relevant conditions of participating homes. An Energy Coach service and other tools to support the retrofit experience are proposed within the Tay Valley Township Program Design.

Tay Valley Township's Environment and Climate Commitments

In August of 2020 Tay Valley Township Council approved *Taking Steps to Make a Difference – A Climate Action Plan* that sets out a 55% reduction in municipal greenhouse gas emissions by 2028 and a 45% reduction in community emissions. That Plan calls for the *development of a Home and Small Business Building Energy program with financing and bulk purchasing capacity*. This report presents the findings from the market analysis undertaken for Tay Valley Township's low rise residential building archetypes and program design considerations and decisions.

The Township also has committed to using a Climate Change Lens in its decisions and this commitment is reflected in a Climate Considerations section being included in all reports to Council.



The most cost-effective source of a unit of energy in Ontario is the one saved. This is because the cost of conservation is considerably cheaper than the cost of extraction, processing, generation and distribution of new energy resources. Therefore, reducing energy demand through building envelope improvements is paramount in any retrofit program design.

The most cost-effective source of a unit of energy in Ontario is the one saved. This is because the cost of conservation is considerably cheaper than the cost of extraction, processing, generating and distribution of new energy resources. Therefore, reducing energy demand through building envelope improvements is paramount in any retrofit program design. Sequencing building envelope measures at the start of a retrofit is important to avoid oversizing mechanical HVAC/DHW systems and other related equipment and appliances.

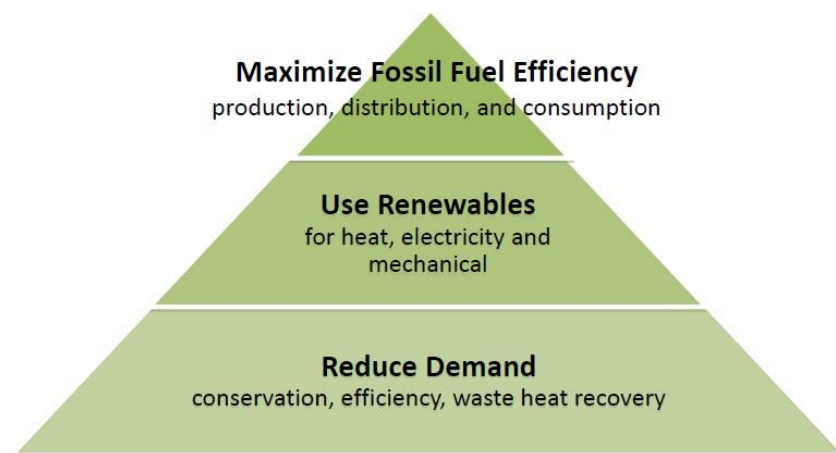


Figure 1: Sustainable Energy Hierarchy for Prioritizing Improvements in Buildings

At home, reducing energy demand could include installing waste-heat recovery units that capture moist warm air exhausted from bathrooms or thermal energy from drain water in showers and kitchens. Improving insulation and windows so that heating and cooling is more effective is another example of reducing demand that can costs and reduce emissions. Insulating can also reduce the size of heat pumps or furnaces needed based on the more efficient energy demand of the home.

Use of renewable energy such as solar roof-top photovoltaic systems or ground-source heating and cooling systems are growing in demand. However, these systems should be considered only after the home has been made as efficient as possible. Solar thermal energy is another form of utilizing renewables to meet needs for heating water. Again, reducing demand for the volume of hot water should be considered first such as using low flow shower heads and faucet aerators. This will enable the renewable thermal energy system to fulfill a greater proportion of hot water needs.

If fossil fuel systems are used for HVAC/DHW, there are technologies that can improve energy efficiency while reducing GHGs such as electric/hybrid heat pumps compared to conventional natural gas furnaces. From a sustainable energy perspective, homeowners using fuel oil or propane should consider advancing building envelope measures prior to fuel switching to efficient electric geothermal or air source heat pumps (ASHPs). See Figure 2 for more examples of energy efficiency and fuel switching measures.

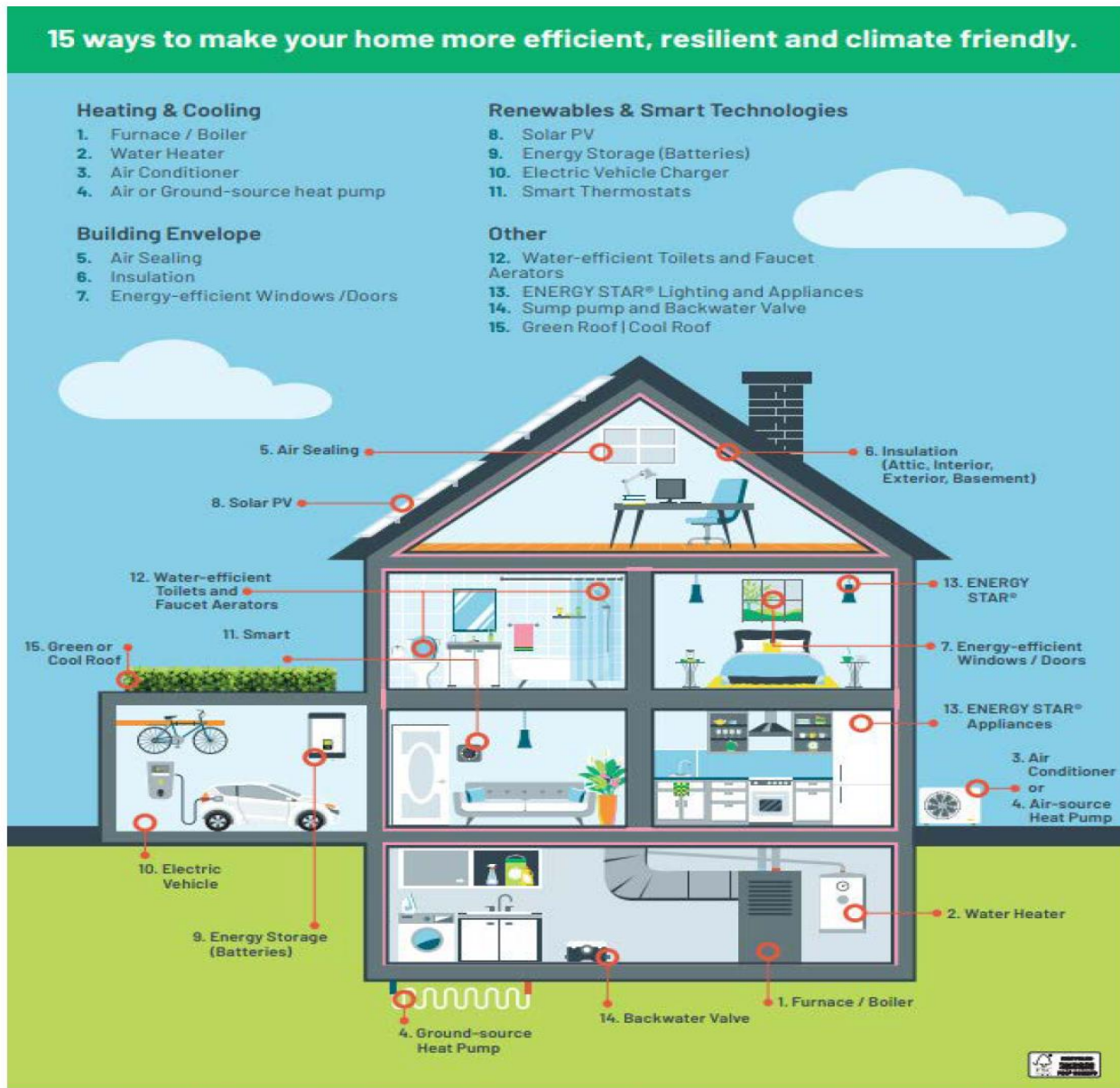


Figure 2 : Potential energy efficiency and climate resiliency measures



When Ontario's cap-and-trade program was in effect there were plans to advance a province-wide building retrofit financing program that included financing and homeowner supports. However, when the provincial government changed in 2018, this was scrapped and progress towards a province wide retrofit program stopped.

The Province of Ontario has tasked electrical and gas utilities with targets related to Conservation Demand Management (CDM) and Demand Side Management (DSM). To meet these targets, electrical and gas utilities have focused primarily on the commercial and industrial sectors. This was due to the complexity and costs associated with achieving reductions from the disaggregated residential sector and the larger reductions that can be achieved by individual commercial and industrial sector customers. The residential supports the utilities have advanced often focused on coupon discounts or incentives for more efficient products (e.g. LED light bulbs) or appliances (such as furnaces and hot water heaters), but they have not yet advanced a whole home retrofit program that would work with property owners to undertake a net zero emission roadmap for their property.

When Ontario's cap-and-trade program was in effect there were plans to advance a province-wide building retrofit financing program that included financing and homeowner supports. However, when the provincial government changed in 2018, this was scrapped and progress towards a province wide retrofit program stopped. In addition, CDM programs were drastically curtailed and moved away from utility delivery towards IESO delivery. At present, the IESO does not have any residential energy efficiency programs in market. DSM programs delivered by Enbridge Gas Distribution continued but targets allocated to Enbridge are not aligned with the province's GHG target and certainly not aligned with science based GHG reduction targets.

Enbridge's Home Efficiency Rebate program provides no financing or customer supports but does provide up to \$5,000 in possible rebates to improve a home's energy efficiency through measures such as increasing the efficiency of the furnace and building envelope improvements. The offering, however, is only available to Enbridge Gas customers.

The federal government's Greener Homes program also doesn't provide financing but does provide incentives up to \$5,000 for building envelope (but does not allow for double-dipping with DSM measures/rebates), renewable, heat pumps, and storage. In 2018 the federal government spoke to a CMHC financing program that would provide \$40,000 in interest free loans for a limited time term, but this program has not been launched yet. In all these programs, customer supports to help homeowners navigate their energy efficiency retrofit is not part of program offerings.

By advancing a Tay Valley Township retrofit program, the Township can address and fill some significant gaps in the existing residential retrofit programs in market such as:



Implementation of BetterHomes Tay Valley Township will create demand for energy audit and trades jobs and stimulate local economic activity for the purchase of related products and services.

In the first four years of the program, an estimated 112 to 210 jobs could be created from these retrofit projects which will increase as participation grows over time.

- Financing: LIC financing that can be attached to the property and not the property owner to enable long term payback and deeper energy and GHG reductions.
- Lack of customer supports to manage retrofits: Energy concierge supports significantly impact on improving program uptake and customer experience thereby increasing word of mouth marketing and driving increased uptake to the retrofit program.
- Additional Incentives: Tay Valley Township residents can benefit from additional incentives that speak to the specific goals of a Tay Valley Township program such as reducing energy costs, driving GHG reduction, and fuel switching from fossil fuels.
- Building Science Expertise in Contractor/Renovator Sector: Contractors and renovators need to increase their building science expertise and experience. Advancing training will improve quality assurance of retrofits.
- Retrofit Ecosystem Advancement: growing the retrofit market to achieve economic development and GHG reduction targets will require actions such as realtor engagement and energy labelling. There is the need for retrofit programs to improve the value proposition for energy efficiency and low carbon in the residential sector beyond just cost savings.

Program Opportunity

Implementation of BetterHomes Tay Valley Township will create demand for energy audit and trades jobs and stimulate local economic activity for the purchase of related products and services. In the first four years of the program, an estimated 112 to 210 jobs (based on \$ 7 million in loans) could be created from these retrofit projects which will increase as participation grows incrementally over time. This number reflects a multiplier of 16 to 30 jobs for every \$1,000,000 spent on retrofitting as described in [Bridge to the Future: Final Report from the Task Force for a Resilient Recovery](#). Furthermore, the energy savings experienced by homeowners can also have positive impacts on local economic activity since most of the money spent on energy costs leaves the community.

Achieving municipal community energy and GHG reduction goals stimulate climate action that plays a key role in the post-pandemic economic recovery by driving investment into the local economy, creating demand for skilled trades workers and releasing millions of dollars in untapped energy savings. The multiplier effect of households and businesses include having reduced utility expenses, a positive impact on local economies in terms of job creation, value added to local economy from project expenditures as well as energy savings reinvested in the purchase of local goods and services.



Clean Energy Canada commissioned a report that indicated economy-wide energy efficiency measures could help reduce our national GHG emissions by 52 million tonnes by 2030 which equates to 25% of Canada's Paris accord commitment. The Report notes that an estimated 118,000 jobs and 1% growth in GDP would be achieved by implementing these measures.

In 2018 Clean Energy Canada commissioned a report that indicated economy-wide energy efficiency measures could help reduce our national GHG emissions by 52 million tonnes by 2030 which equates to 25% of Canada's Paris accord commitment. The Report notes that an estimated 118,000 jobs and 1% growth in GDP would be achieved by implementing these measures. The Report flags that if governments across the country adopted aggressive efficiency measures addressing electricity, natural gas and other fossil fuels, the potential impacts are significantly larger at 79 million tonnes of avoided emissions along with almost \$600 billion in net economic activity. Another study estimated that for every dollar spent on energy efficiency GDP increased by \$5 to \$8. Job growth potential in Ontario from investments in energy efficiency are significant.

A long-term retrofit program can support a market transformation of associated trades and audit services as well as related products and equipment as demand continues to build over time as the program is scaled up. Job creation for trades for installation of equipment and residential insulation as well as for home energy assessments are also an opportunity to tap into local post-secondary schools to help grow the labour force to deliver this program to reach thousands of households.

In addition to job creation, enabling deep energy savings can help improve housing affordability in terms of reduced operating expenses which can free up more disposable income of residents for other priorities. By using promotion of a retrofit program to raise energy literacy, informed homeowners can also make better decisions about their largest investment of their lives – purchasing a home. In the future, mandatory home energy labelling at time of sale could be a useful tool for consumers concerned about operating costs, the indoor air quality and moisture control benefits as well as the environmental improvement from retrofits. This would be like comparing the fuel economy of automobiles for consumers whose operating costs and carbon footprint are important to their purchasing decision making process.

In addition to retrofits reducing energy use and GHG emissions at home, they can also improve resilience to the changing climate, for example using on-site energy storage during weather-related power outages. In addition, better indoor air quality and temperature control from improved air ventilation, air sealing and insulation will make homes more comfortable all year-round while potentially improving the durability of residential buildings by reducing premature degradation of the structure and its operational systems.



Many households are concerned about the affordability of energy improvements even though they may be struggling with high utility bills. Upfront costs for deep retrofits can exceed \$20,000, and although a loan-based retrofit program can help alleviate upfront capital, consumers have come to expect rebates, not financing.

In addition, homeowners need supports to navigate the energy efficiency retrofit process.

Program Barriers

The question remains that if there is such a robust business case associated with each of the low-rise residential archetypes, why has building envelope improvements and fuel switching not already happened? There are several significant barriers that limit uptake to energy efficiency measures within the residential building stock.

Disruption— undertaking and managing any renovation is a time-consuming and potentially disruptive effort, especially for building envelope measures. For example, insulation, door and window upgrades often require different contractors, thereby increasing the work required on the part of the homeowner to secure quotes, select their contractors and then schedule each of them across different schedules and in the correct sequence.

Cost - many households are concerned about the affordability of energy improvements even though they may be struggling with high utility bills. Upfront costs for deep retrofits can exceed \$20,000, and although a loan-based retrofit program can help alleviate upfront capital, consumers have come to expect rebates, not financing. Inequities are compounded by the fact that those who can access private financing, and pay for measures upfront, are generally those who can access rebates, which require upfront payment before reimbursement.

Lack of customer supports – homeowners need supports to navigate the energy efficiency retrofit process. Managing retrofits is time consuming and few property owners (or their contractors and renovators) have knowledge of building science and the business case for GHG reduction opportunities.

Tenure - Some retrofits may have extended 10 to 20-year paybacks which may exceed the homeowner's expected or actual ownership of the building. Therefore, some homeowners may be reluctant to take on such long-term payback projects, which may require using debt financing, as many residents may sell their homes within 5 - 8 years of acquisition.

Education – Most homeowners undervalue energy efficiency and conservation opportunities. It is rarely appreciated that the cheapest unit of energy is the one saved compared to increasing new energy supply, which customers pay for in the end.

Mortgage lender concerns - Concerns from mortgage lenders or existing loan providers on homeowners use for financing has been an issue. The creation of priority liens on a property and homeowner debt capacity are aspects of risk management that need to be addressed in creating a viable financial model for



BetterHomes Ontario was convened to meet the municipal need for a 3rd party retrofit program delivery partner. It is a joint program of the Association of Municipalities of Ontario (AMO), Clean Air Partnership and Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). The BetterHomes Ontario consortium model provides a 3rd party delivery model for Town of Tay Valley Township to consider.

program participation.

Retrofit workforce limitations - Having an adequately sized, engaged and skilled local workforce is a critical success factor to implementing and sustaining long-term retrofit programs. Ensuring that contractors and energy auditors can support the increased demand for home energy retrofits should be addressed within program design.

BetterHomes Ontario

BetterHomes Ontario was convened to meet the municipal need for a 3rd party retrofit program delivery partner. It is a joint program of the Association of Municipalities of Ontario (AMO), Clean Air Partnership and Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). The BetterHomes Ontario consortium model provides a 3rd party delivery model for Tay Valley Township to consider. Below is a brief description of the overall roles and responsibilities of each of the BetterHomes Ontario Consortium partners.

- Market analysis and feasibility, program design, proposal development (CAP)
- Municipal recruitment, municipal onboarding & support, proposal development (AMO)
- Program administration, marketing and energy concierge (CAP)
- Contractor verification, outreach and training (HRAI)
- Non-contractor community outreach/partnership development (CAP)
- Monitoring, verification, evaluation and program improvements (CAP, AMO)
- Future program offerings (CAP, AMO, HRAI)

The City of Toronto and City of Ottawa programs already use BetterHomesTO and BetterHomes Ottawa branding. We encourage Tay Valley Township to join this consortium and reap collective promotional and branding opportunities through use of BetterHomes Tay Valley Township.

PART 2: RETROFIT MARKET ANALYSIS

FCM CEF Feasibility Analysis Program Stream



The average Ontario household uses about 9,000kWh of electricity and 2,400m³ of natural gas each year at a combined average annual cost of \$2,165.

In comparison to the Ontario average, Tay Valley Township residents pay higher energy costs and present an excellent opportunity for energy cost savings and GHG reductions from the advancement of a retrofit program

Tay Valley Township joined a CAP FCM CEF proposal alongside another 6 Ontario municipalities (Huntsville, London, Barrie, Clarington, Kawartha lakes, and Dufferin County). CAP worked with Lightspark Inc. on the market analysis and feasibility study to explore and assess options for a financing program for home energy upgrades that can achieve triple-bottom-line (environmental, economic and social) benefits within the community. Undertaking the market analysis and feasibility work through a cohort approach reduces the financial and staff resources required from each municipal participant.

In the Feasibility Analysis, Lightspark used an innovative program design platform using a data model that incorporates energy consumption, housing data and behavioural economics data. These data provide a municipality with an overview of residential building archetypes and the value proposition for energy efficiency improvements for each archetype. Lightspark also undertook preliminary geospatial mapping of archetypes to inform marketing and outreach efforts. This comprehensive view of a community's building stock enables an understanding of the gap between the current state and potential state of improved homes, and the barriers to program uptake. These analyses are then brought into program design to determine priority target audiences for program promotion and incentive design.

Residential Archetypes

The average Ontario household uses about 9,000kWh of electricity and 2,400m³ of natural gas each year at a combined average annual cost of \$2,165. In comparison to the Ontario average, Tay Valley Township residents tend to pay higher than average energy costs and present a good opportunity for energy cost savings and GHG reductions from the advancement of a retrofit program.

Home energy consumption varies widely based on factors such as the physical size and condition of the home, the number of people living there, as well as the type of equipment used to heat and cool the home and its water. Annual variation in temperature also affects residential energy consumption. In more rural areas where there may be no natural gas service available, homes may have higher electricity consumption and may use a heating fuel such as oil, propane, or wood. In general, the more a household spends on energy the better the economic business case for energy efficiency retrofits.

From the market analysis undertaken by Lightspark there are 7 main low rise residential building archetypes in Tay Valley Township. Each archetype has been divided into a hot, warm or cool energy efficiency market calculated based on the ability of the property owner to build a business case for retrofitting. Achieving this threshold provides the economic ability to achieve a “free” retrofit in that instead of spending money of energy costs, the property owner can transfer those costs to their LIC loan repayment. Upon the full repayment of the retrofit loan those energy savings would then be accrued by the property owner. In addition, the ability to incorporate renewables into the eligible measures will help address electricity prices whereby those properties appropriately sited for solar can reduce their vulnerability to peak electricity pricing. In addition to identifying the main archetypes, the Tay Valley Township market analysis also mapped out the archetype distribution. This mapping can inform marketing and outreach efforts for the program.

Tay Valley Township Archetypes	Carbon Score t/CO2/year*	Energy Costs \$	Dwelling Counts	Total Energy Costs \$	Building Envelope Market \$	Fuel Switch Market \$
A	7.69	5,375	333	1,789,875	Hot	Hot
B	7.61	5,865	80	469,200	Hot	Hot
C	16.61	9,840	323	3,178,320	Hot	Hot
D	6.99	5,088	293	1,490,784	Hot	Hot
E	1.4	3,644	447	1,628,868	Warm - Hot	Already Electricity
F	5.55	2,827	101	285,527	Warm	Cool
G	1.69	4,744	291	1,380,504	Hot	Already Electricity
Total			1,868	10,223,078		

* Higher the number, higher the GHG emissions

Figure 3: Tay Valley Township Residential Building Archetypes and Economic Potential

Archetype A

01



These homes have a relatively large floor area, and are oil heated with low/mid efficiency furnaces and use electric hot water systems

Average annual electricity costs: \$1,812

Average annual oil costs: \$3,506

Average annual energy costs: \$5,375

Client Implications:

These homes consume 157.5 GJ (0.66 GJ/m²) of energy on average and produce 7.69 tCO₂e (0.032 tCO₂e/m²) on average. They represent 17.8% of the housing stock in Tay Valley.

Archetype B

02



These homes have an above average floor area, and are wood heated with and use electric hot water systems

Average annual electricity costs: \$1,712

Average annual oil costs: \$95

Average annual propane costs: \$52

Average annual wood costs: \$3,998

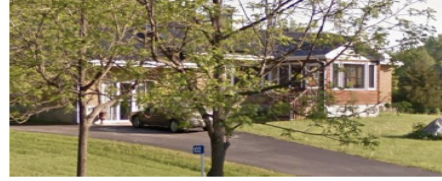
Average annual energy costs: \$5,865

Client Implications:

These homes consume 340.4 GJ (1.86 GJ/m²) of energy on average and produce 7.61 tCO₂e (0.042 tCO₂e/m²) on average. They represent 4.3% of the housing stock in Tay Valley.

Archetype C

03



These homes have a relatively large floor area, and are oil heated with low/mid efficiency furnaces and use electric hot water systems

Average annual electricity costs: \$1,825

Average annual oil costs: \$7,931

Average annual wood costs: \$50

Average annual energy costs: \$9,840

Client Implications:

These homes consume 290.4 GJ (1.18 GJ/m²) of energy on average and produce 16.61 tCO₂e (0.067 tCO₂e/m²) on average. They represent 17.3% of the housing stock in Tay Valley.

Archetype D

04



These homes have an above average floor area, and are propane heated with high efficiency furnaces and use electric hot water systems

Average annual electricity costs: \$1,653

Average annual oil costs: \$55

Average annual propane costs: \$3,354

Average annual energy costs: \$5,088

Client Implications:

These homes consume 152.9 GJ (0.71 GJ/m²) of energy on average and produce 6.99 tCO₂e (0.033 tCO₂e/m²) on average. They represent 15.7% of the housing stock in Tay Valley.

Archetype E

05



These homes have a relatively large floor area, and are electricity heated forced air furnace and use electric hot water systems

Average annual electricity costs: \$3,493

Average annual oil costs: \$83

Average annual energy costs: \$3,644

Client Implications:

These homes consume 102.5 GJ (0.39 GJ/m²) of energy on average and produce 1.4 tCO₂e (0.005 tCO₂e/m²) on average. They represent 23.9% of the housing stock in Tay Valley.

Archetype F

06



These homes have an above average floor area, and are natural gas heated with high efficiency furnaces and use electric hot water systems

Average annual electricity costs: \$1,638

Average annual natural gas costs: \$1,058

Average annual oil costs: \$62

Average annual energy costs: \$2,827

Client Implications:

These homes consume 146.6 GJ (0.69 GJ/m²) of energy on average and produce 5.55 tCO₂e (0.026 tCO₂e/m²) on average. They represent 5.4% of the housing stock in Tay Valley.

Archetype G

07



These homes have an above average floor area, and are electricity heated baseboard/hydronic/plenum(duct) htrs. and use electric hot water systems

Average annual electricity costs: \$4,609

Average annual propane costs: \$77

Average annual energy costs: \$4,744

Client Implications:

These homes consume 133.8 GJ (1.08 GJ/m²) of energy on average and produce 1.69 tCO₂e (0.014 tCO₂e/m²) on average. They represent 15.6% of the housing stock in Tay Valley.

Energy Burden By Archetype

The Canadian Urban Sustainability Practitioners (CUSP) group developed a database and mapping tool to identify areas experiencing disproportionately high household energy costs. Home energy cost burden is calculated as a percentage of total after-tax household income that is spent on heating and electricity within the home. The median Canadian household spends less than 3% of its after-tax income on home energy. Households that spend more than 6% on home energy experience high home energy cost burdens. For purposes of policy and program development, CUSP uses this 6% threshold of home energy cost burden as high, 10% as very high and 15% as extreme.

There exists a paradox for many households struggling to pay disproportionately high energy bills relative to their disposable income. The lack of available capital is a significant barrier to making home improvements that would provide long-term utility cost relief. The upfront costs to improve energy efficiency is often prohibitive for low-income households. In addition, many low-income households may also not own their home and have no authority to make such improvements that would significantly affect their utility bills.

The market analysis undertaken for Tay Valley Township has identified that Tay Valley Township property owners are experiencing a higher level of energy poverty than the Canadian average.

Energy Burden Across Archetypes

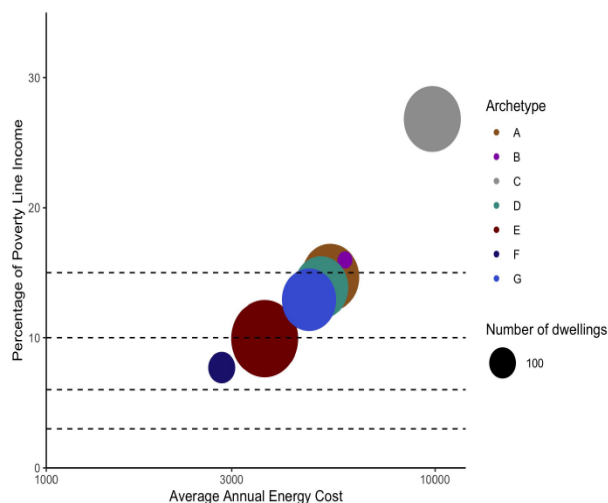
Energy Burden is the percentage of income spent on heating/cooling and electricity

Archetypes C, B, and A have the highest burden.

Using a benchmark annual household income of \$36,711, such a household living in a home in Archetype C would be paying 26.8% of their income on heating/cooling and electricity

Archetypes B and A spend 16.0 and 14.6%, respectively, on heating/cooling and electricity.

Moreover C, B, and A account for 39.4% (736) of the dwellings



Lightspark

Figure 5 : Energy Burden by Archetype

PART 3: PROGRAM DESIGN



In addition to undertaking the market analysis for Tay Valley Township's residential low-rise sector, the feasibility project included the development of a proposed program design based on leading practices, internal municipal consultations, and consultations with those in the retrofit advancement sector.

In addition to undertaking the market analysis for Tay Valley Township's residential low-rise sector, the feasibility project included the development of a proposed program design based on leading practices, internal municipal consultations, and consultations with those in the retrofit advancement sector.

The guiding principles used to design the Tay Valley Township program design include:

- Be customer oriented to ensure that the program makes for the best customer experience possible
- Balance program design flexibility with streamlining and consistency goals across community programs
- Reduce administration burden on municipalities
- Increase deep energy retrofit uptake
- Advance the financial sustainability of the program over time
- Increase stakeholder awareness and training within renovator sector
- Streamline program outcomes, tracking, evaluation and improvement

It is important that the Tay Valley Township program learns from other programs in market. Clean Air Partnership developed the [Accelerating Home Energy Efficiency Retrofits Through Local Improvement Charge Programs Toolkit](#) to provide the top level frameworks and leading practices for program design and delivery. In addition, there is a significant critical mass of retrofit programs coming into market in the near future.

Municipality	Program Status
City of Toronto	Program in market since 2014, moved from pilot to community wide in 2015, recapitalized in 2021 through FCM CEF program.
City of Ottawa	Launched in fall of 2021
Durham Region	Launched in Spring of 2022
City of Kingston	Launched in early 2022
City of Guelph	Secured funding from FCM CEF
Town of Halton Hills	Homeowner engagement, limited customer uptake at pilot stage
Waterloo Region	Program design stage – working across regional municipalities
City of Peterborough	Program design stage

City of Burlington and Hamilton	Program design stage – working in partnership with Mohawk College
Town of Newmarket	Program development for a turn-key option. Serving as general contractor for retrofit customers. Exploring the role of a municipal service corp.
City of Windsor	Program development for a turn-key option. Serving as general contractor for retrofit customers. Exploring the role of a municipal service corp.
City of Thunder Bay	Market analysis and program design stage

Figure 6: Status of Municipal Energy Efficiency Programs in Ontario

Ontario's LIC Legislation

Local Improvement Charges (LICs) have been used for decades in Ontario to finance block level improvements such as provision of roads, water and waste-water services. LIC legislation was amended in 2012 to allow for new eligible measures including energy efficiency, renewable energy, or water conservation. Municipalities in Ontario are given broad legislative authority to use LICs in this manner by creating a program to provide homeowners with a loan to implement these measures on their property. These loans, which are attached to the property and not the owner, can have much longer repayment terms and lower interest rates than conventional forms of borrowing from financial institutions.

Repayment is arranged as an addition to individual property tax payments. The benefit of this is two-fold: a) it can assist homeowners with accessing capital for high upfront costs of retrofits and b) enables transfer of the lien to a new owner in cases where the loan applicant wants to sell their house before the LIC repayment have been made in full. The latter is particularly useful where the retrofits have a long-term payback period.

To meet the requirements of the Ontario regulations for LIC loans, the applicant must meet the following criteria:

- The applicant is the homeowner of the property;
- All property owners' consent to participation in the program; and
- The property is located within the applicable municipality.

The Regulation sets out several requirements for establishing a local improvement charge program to finance energy retrofits, including:

1. The municipality must enact a by-law to authorize the undertaking of energy efficiency works on private residential property as local improvements in accordance with Section 36.5 of the Regulation.

2. Before passing a by-law to undertake work as a local improvement under Section 36.5 of the Regulation, the municipality must give public notice of its intention to pass the by-law.
3. The municipality and the property owner must enter into an agreement in which the owner consents to their lot being specially charged.
4. The municipality must pass a by-law to establish a reserve fund for the local improvement charges.

A summary of the various procedural steps to embed the LIC within the retrofit program is provided below:

1. Council approves the direction to advance a Tay Valley Township Retrofit Program and develop a CEF proposal to FCM to secure grants and capital for the Program.
2. Council identifies and commits to contributing the 20% of total program costs that must come from non FCM funds. These 20% of non FCM funded program costs can come from municipal capital reserves, Infrastructure Ontario, or 3rd party capital. It is recommended that the Township allocates its portion of total program costs to the capital that will be loaned out to residents to ensure that the municipal funds allocated to the program and therefore will be coming back to the municipality as recoverable debt.
3. Council enacts a by-law authorizing the undertaking of energy efficiency and water conservation works (as it relates to reduced energy for heating water) as local improvements under the residential retrofit program.
4. Following a home energy assessment, the municipality and property owner enter into a Property Owner Agreement (POA) for the homeowner to undertake the retrofits as a local improvement on the benefitting property and to raise the cost of the work by imposing a special charge on the benefitting property.
5. Retrofit work is completed and a post-retrofit home energy assessment is conducted.
6. Local Improvement Roll is prepared setting out the cost of the work, the proposed special charges, when the charges are to be paid, and the lifetime of the work.
7. Municipality gives notice of the proposed Local Improvement Roll to the property owner and the municipal Treasurer certifies the proposed Local Improvement Roll.
8. Municipality enacts by-law providing that the amount specially charged on the lot set out in the roll is sufficient to raise the lot's share of the cost through annual payments and that a special charge will be imposed in each year on the lot equal to the amount payable in that year.
9. By-law is deemed to be repealed on the date that the Treasurer certifies that the special charge has been paid in full.

The following is a list of the various program design components this Design Report covers.

1. Financing
2. Program Administration
3. 3rd Party Delivery
4. Homeowner Supports
5. Incentive Management
6. Contractor Engagement and Training
7. Verification for Program Participation

8. Loan Loss Reserve Fund

Financing

Financing is a critical barrier for retrofit programs. It is recommended that the Tay Valley Township program use the LIC mechanism to administer the loan securitization. While this does place an administrative burden on the municipal finance department, there is the ability to allocate FCM CEF grant funding towards covering the program's municipal administration costs. Beyond the scope of the 4-year CEF funding there is an opportunity to use administration fees to cover program administration costs.

Type of Financing	Pros	Cons
LIC Attached Financing	<ul style="list-style-type: none">• Attached to property• Can provide lower interest-rates• Lower risk of defaults• Longer term pay back options• Can be paid back at any time• Can meet the needs of a larger demographic	<ul style="list-style-type: none">• Needs to be administered via property tax collection system• Set up/Admin costs
3rd Party Financing	<ul style="list-style-type: none">• Available in market to select residents – those with home equity or adequate income• Unlikely to support low-income residents experiencing energy poverty, and/or new property owners	<ul style="list-style-type: none">• Attached to property owner and not property• Often higher interest rate if unsecured loan• Not available to all residents• Has equity implications
On-Bill Financing	<ul style="list-style-type: none">• Less utilities than municipalities• Link to energy savings	<ul style="list-style-type: none">• Requires partnership with utility to provide financing• Utilities not participating thus far• Interpreted to be attached to property owner• Regulatory challenges

Administration

One of the barriers limiting the municipal delivery of community retrofit programs has been the concern related to the potential administration to deliver these programs. There is also concern across municipalities related to the potential for duplication and increased costs related to program start up and delivery of individual community-based programs. Municipalities have been seeking partnerships with 3rd party entities who can administer and deliver these retrofits programs. There are several benefits to working with a 3rd party partner to deliver retrofit programs.

- Reduce program costs and administration burden for municipalities, better business case for clients

- Ability to use local, regional and provincial promotional avenues to drive program uptake
- Efficiencies of scale to support market development and capacity building
- Improved customer relations and experience
- Improved consistency and reduced market confusion across jurisdictional boundaries
- Consistent monitoring and evaluation methodologies, with better and broader data access
- Streamlining of contractor engagement, delivery, and training



Figure 8: 3rd Party Administration Potential

While a 3rd party can significantly reduce the municipal administrative burden, the municipality must be responsible for the following roles should an application to the FCM CEF funding stream be successful.

- Council needs to pass an LIC by-law. A draft LIC by-law template will be provided. FCM CEF program funding criteria requires the applicant municipal council pass a by-law or a council resolution that commits the municipality to using the LIC mechanism prior to applying to the FCM CEF funding stream. The by-law can be updated if program funding is secured.
- Tay Valley Township must enter into an agreement with FCM if the CEF application is successful.
- While the 3rd party can ensure that the applicant meets all program eligibility requirements, and that the application is full and complete, as the LIC is between the municipality and the property owner, the LIC agreement must be between the municipality and the property owner.
- The municipal finance department must set up the structure to attach the loan to the property tax system, distribute loan payments, and set up recollection process via the tax system.

These components describe the minimum requirements from the LIC legislation and FCM CEF funding stream. A more detailed description of the other suggested program design actions that are recommended for a Tay Valley Township retrofit program follows. The municipality may undertake any or all the below program components, but it is also possible for the Tay Valley Township program to allocate all or a selection of these responsibilities to a 3rd party.

Homeowner Supports

Residents require supports to navigate energy efficiency programs, selection of measures, contractor management, and other supports to streamline and improve the retrofit experience. It is, together with financing, one of the primary gaps that a Tay Valley Township FCM CEF program can help address.

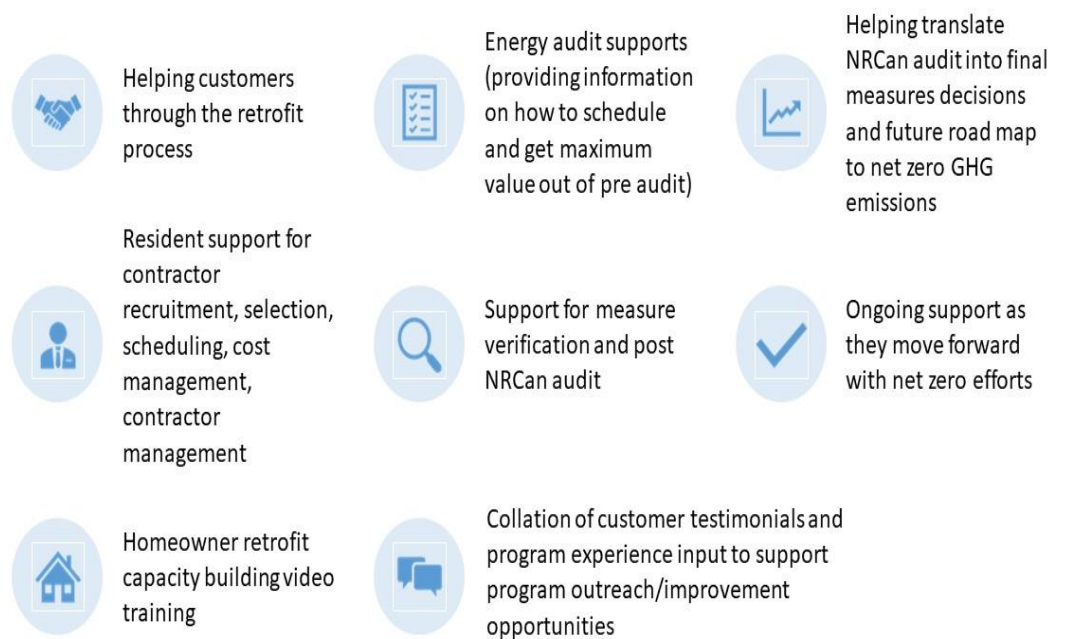


Figure 9: Potential Concierge Supports

Incentive Management

The FCM CEF funding stream can include incentives. The purpose of incentives can include:

- Accelerating program uptake
- Reducing energy poverty
- Driving deep energy retrofits
- Driving fuel switching

There can be trade-offs with these goals (e.g. energy poverty v maximizing GHG reductions). It is therefore important to determine the aspirational outcome of incentive design prior to finalizing design. Incentives can take the form of a maximum allocation for a specific measure (prescriptive, e.g. \$2,500 for an air source heat pump), or a maximum allocation for a specific level of performance (performance, e.g. up to a maximum of \$5,000 written off the loan for a minimum 30% GHG reduction). Some of the design principles that are recommended for a Tay Valley Township incentive program are:

- Avoid duplication with current available incentives: Use incentives to address market gaps that speak to Tay Valley Township 's building archetypes (incentives to drive uptake and support the business case for fuel switching from fossil fuel heated homes). Identify the balance in addressing energy poverty and GHG emissions. For example, for electrically heated homes there are significant costs savings from building envelope measures, however there isn't likely to be significant GHG reductions from electrically heated homes compared to homes heating by fossil fuels.

The municipality can delegate incentive management to a 3rd party. This incentive management would include:

- Providing customers with support on available incentives and coordinating customer applications to existing and future incentives (e.g. Enbridge, Canada Greener Homes, BetterHomes Tay Valley Township).
- Manage all incentive applications, verifications, payments and reconciliations.

Contractor Engagement and Training

Building the number of and skills of energy efficiency contractors and renovators is a key challenge. There are a limited number of renovators and contractors that can meet even the current demand within the retrofit market. It is recommended that a Tay Valley Township program engage local contractors so that they can inform their clients and support program awareness and uptake. As the program grows, there are opportunities to increase offerings and drive building science training and general contractor supports. HRAI has played a significant role in contractor verification, outreach and training for utility, GreenON and BetterHomes Toronto and Ottawa programs. Contractor management, engagement and training can include the following goals and actions:

- Contractor verification – rules and minimum requirements for program participation
- Increase awareness amongst contractors so they can promote the program
- Increase the energy efficiency knowledge base amongst contractors
- Use program demand to drive an increase in the number of available contractors
Build diversity and capacity within contractor trades
- Create transparency around retrofit costs and experience

Loan Loss Reserve

Many stakeholders have concerns about the risks associated with defaults on LIC loan payments. These stakeholders include mortgage lenders, program administrators, third party financiers, and participating municipalities. They are concerned about lost revenues or added program costs from missed or default LIC payments or if a property goes to a tax sale. LIC loans exercise priority liens in the case of a tax sale, but only the payments in arrears are collected. The remaining LIC still rests with the property and payments on the LIC continue once the new owner takes possession. LIC loans, in general, have a history of very low default rates. These rates are lower than for mortgages and property taxes. Loan loss reserves can address mortgage lender concerns related to the attachment of a LIC to a property with a mortgage attached to it.

The only risk to the mortgage lender stems from the risk of the property selling for less than the mortgage attached to the property. In this circumstance the loan loss reserve can cover the financial liability associated with the LIC payments between the period for when that property went into default, to when the new property owner takes possession and begins making LIC repayments. The use of a loan loss reserve can reduce the concerns of mortgage lenders and streamline application review and processing.

Loan loss reserves are often set up to be 5- 10% of the total amount of capital lent by the program (e.g. for a \$10 million loan amount the loan loss reserve would be 500K at 5%). Loan loss reserves have been set up in several retrofit programs across the United States (e.g. Connecticut, Michigan, and California). To date no claims have been made against loan loss reserves in place.

It is recommended that BetterHomes Tay Valley Township incorporates a loan loss reserve of 5% of loan capital to streamline application approval and reduce mortgage lender concerns. FCM CEF funding allows for a loan loss reserve to be created for programs via the grant portion of program costs.

Participant Verification

As Tay Valley Township residents will be borrowing money there is the need to undertake financial due diligence to reduce the risk of loan defaults. There is no doubt that financial verification is critical, however there is a recognition that the more financial verifications placed on program participation, the greater the drop off between applications and actual retrofits undertaken. It is recommended that BetterHomes Tay Valley Township use the tax account in good standing financial verification method and incorporate a loan loss reserve fund into program design.

Financial Verification	Notes
Tax Account in Good Standing	Municipality can undertake at no cost and very low admin burden
Utility Account in Good Standing	If a municipality owns the electrical utility, account status can be easily determined.
Credit Check	3 rd party credit checks can be purchased but may limit participation from lower income residents
Mortgage Lender Approval	This may allay mortgage lender concerns, but it is also likely to be a significant barrier to program participation

Figure 10: Potential Verification Measures

PART 4: FCM FUNDING APPLICATION

Proposal Development

Tay Valley Township along with the 6 other cohort municipalities are working to meet the eligibility requirements needed to submit an FCM CEF capital and grants application. A grant stream that can boost project delivery is critical to enabling the startup resources required to develop and deliver these programs. This funding stream was provided to FCM by the federal government to support the ability of municipalities to deliver residential building retrofit financing programs. It targets the low-rise residential sector, which has long been underserved.

The program is a \$300m fund that is available for a 3-4 year period (or until funds are fully allocated). A successful program application can provide up to a maximum of 80% of total program costs. 20% of total program costs need to come from other non-federal funds. There is also a requirement that financing be a core component of the program's design. It is recommended that to reduce the financial burden of these programs on the municipal tax base that the 20% of total program costs being provided by the municipality to the program be allocated to capital for loans to residents. That way there is the ability for municipalities to fully recuperate program funding as loan repayments from participating property owners.

There are a variety of sources for where the 20% of total program costs can come from:

- Municipal capital reserves
- Infrastructure Ontario
- 3rd party private capital that the municipality borrows

Ensuring the longer-term financial sustainability of the program will rely on other revenue sources such as: adding administration fees, reducing marketing and outreach costs for contractors by aggregating demand, bulk purchasing, and other revenue opportunities.

There are several requirements a municipality needs to meet to be considered for a Capital Projects stream.

- Evidence of having completed detailed market analysis and program design work (this report).
- Passing a LIC by-law or similar council resolution that authorizes the use of the LIC mechanism.
- The FCM CEF funding opportunity provides up to a maximum of \$10 million per municipality with grants to support program start up and delivery costs being limited to no more than 50% of total loan amount (and cannot exceed the total program start-up and operating costs).
- The combined loan and grant can cover up to 80% of total eligible program costs. 20% of total program funding needs to be from non FCM capital.
- Municipalities can use their capital reserves or borrow from Infrastructure Ontario or borrow private capital to secure their 20% of total program costs.
- The 20% of non FCM funds can be allocated to the loan portion of the program budget and would thereby not place a financial burden on Tay Valley Township in that the matching contribution to total program costs would be 100% recoverable via loan repayments.
- The grant funding stream addresses municipal resource constraints as it provides grants for program set up and delivery.

BetterHomes Ontario provides municipalities with support to develop the FCM CEF application. The proposal application can be a time-consuming endeavor. Support in proposal development was identified as a valued support that a 3rd party could provide for municipalities aiming to advance retrofit programs in their community. FCM CEF rules allow for entities to be compensated for proposal development investments in the event of a successful application.

If a FCM CEF proposal is successful there will also be the need for ongoing reporting to FCM on program activities, outputs, and outcomes. Should a municipality be concerned regarding the administrative burden, a 3rd party can manage FCM reporting requirements.

Municipal Capital Contribution

FCM CEF program rules mean that FCM can provide up to a maximum of 80% of total program costs (both loans and grants). As such there is the need to identify where the remaining 20% would be sourced from. Financing for loans can come from municipal capital reserves, green bonds, Infrastructure Ontario loans, or via private sector financing. The goal is that the program can provide attractive interest rates. It is likely that private sector financing will require a higher interest rate than public funds. As the program grows, private sector financing would be incorporated on an ongoing basis into the program. It is important for Tay Valley Township Council to determine where the 20% of matching contributions would come from prior to applying into the FCM CEF stream.

Risk and Risk Mitigation

All programs have risks associated with their design, development and delivery. Some of the most common risks associated with retrofit programs include:

Administration costs: retrofit programs can be labour intensive due to the setting up of the infrastructure and systems during program establishment. A key benefit of the FCM CEF grant stream is that it mitigates early program set up and administration costs.

Default Risk: due to priority lien status, liability related to defaults rests more with mortgage lenders than with municipalities. Incorporation of a loan loss reserve addresses the concerns of mortgage lenders. The FCM grant funds can be allocated to a loan loss reserve.

Municipal Core Responsibility: Based on municipal consultations there are concerns within the municipality related to the municipality acting as a bank. The issue is that while banks lend money, they do not deliver retrofit programs or address municipally directed priorities such as addressing energy poverty, GHG reduction, or improving housing stock.

Program Longevity: Funds specifically support program establishment and administration for 3–4 years. Beyond that period admin fees, bulk purchasing, marketing cost reductions, etc will support program costs. There is no expectation that property taxes will be allocated to program costs. The goal is that these programs become financially self-sustaining.

Municipal Debt Limits: Ontario municipalities have limited abilities to borrow money due to legislated debt limits. However, funds borrowed to finance retrofit programs do not count towards municipal debt limits because they are repaid as recoverable debt.

Program Scale-Up

Increasing the offerings of retrofit programs in market is a critical factor in growing the retrofit ecosystem. However, that is simply the beginning of the actions needed to achieve the scale up needed in the existing building retrofit market. Single municipal programs functioning in isolation are less likely to achieve the scale up needed to meet our GHG targets. Below are possible interventions and priority actions areas that retrofit program can help support to drive retrofit scale up opportunities.

- **Program availability:** To support the residential sector to undertake energy efficiency retrofits, we need available programs.
- **Customer support:** This is a critical factor in improving the retrofit experience of property owners and thereby enabling past retrofit clients to be spokespeople and promoters for programs.
- **Energy advisor availability:** Ontario needs more energy advisors. This will be achieved by higher orders of government through incentives for training and by building the demand for their services.
- **Contractors as allies:** Engaging this critical stakeholder in retrofit programs will ensure they can be an effective sales force for retrofit programs and measures. [HRAI has undertaken consultations](#) to better understand how retrofit programs can support contractors in scaling up low carbon retrofits.
- **Contractor knowledge:** There is a need to build up the building science and low carbon expertise of contractors. This will be critical to ensuring quality retrofits are undertaken and unintended consequences are minimized.
- **Realtors as allies:** Realtors are ideal in reaching out to property owners at the point of purchase/sale. The realtor network is also critical to driving acceptance of energy labelling to increase transparency related to energy and GHG considerations during purchase decisions.
- **Business case for energy efficiency:** At present the value proposition related to energy efficiency improvements is mainly connected to cost savings. Ideally the goal is to achieve a “free” retrofit in where resulting energy savings are equal or more than loan repayments. Future carbon price increases and additional value proposition components must also be considered in business case development.

- **Rental market:** It is challenging to deliver energy retrofits in rented homes, especially where the tenant pays for energy, so there is no incentive for the landlord to improve performance.
- **Additional policy goals:** FCM's CEF program is targeted at the low-rise residential sector. However, once these retrofit programs are in place there is the ability for these programs to not only serve the low-rise residential sector, but also the multi-unit residential sector, the commercial sector and the rental property sector. These programs can also advance additional policy goals such as flood protection, secondary suites, or aging in place. It is recommended that all programs seek to address one or more of these areas, either at start-up, or over time.

Program Budget

To secure program funding for a BetterHomes Tay Valley Township program there is the opportunity for Tay Valley Township to submit a capital and grants proposal to the FCM CEF funding stream. BetterHomes Ontario is keen to work with Tay Valley Township to develop and submit of FCM CEF proposal if Council approves that direction. Below is a sample example of a possible budget for a BetterHomes Tay Valley Township program, recognizing that the total budget for such a program would need to be finalized based on the 20% matching contribution requirement.

Example of Hypothetical Home Retrofit Program Budget

Expense	FCM	Municipality/Private Sector	Partner/Other
Capital for Loans	\$6,000,000 loan	\$2,000,000 loan	Capital can come from capital reserves, Infrastructure Ontario, private sector
Start Up Costs (website, CMS, Outreach, contract)	\$300,000 grant	In-kind is possible	In-kind is possible
Admin Costs (for 3 rd party and municipality)	\$1,000,000 grant	In-kind is possible	In-kind is possible
New Incentives	\$2,500,000 grant		Other incentives can go towards total program costs
Program Growth & Development	\$200,000 grant	In-kind is possible	In-kind
Total	\$10,000,000	\$2,000,000	

Figure 11 Sample Program Budget

Building the financial rationale for residents is critical to enabling these programs to meet community needs and achieve the scale up needed to achieve GHG and economic development goals. The ideal client scenario is a “free” retrofit, whereby the energy cost savings can cover the loan repayments. This is a critical threshold to achieve for lower-income residents especially. For larger homes heated by oil, propane, wood, and electricity, this threshold is much easier to achieve. However, for smaller sized housing archetypes, of a newer building

stock and heated by cheaper natural gas, this financial threshold will often need to include future carbon price increases, a longer-term payback time frame, and a lower interest rate. Below is a sample resident retrofit budget for the most challenging archetype of a newer, natural gas heated home.

Property Owner Loan	Property Owner Repayments	Property Owner Avoided Energy Costs
<ul style="list-style-type: none"> • \$25K Loan – \$7,000 Greener Homes/Enbridge Incentives – possible FCM funded \$3,000 Huntsville Incentives = \$15K Loan • FCM funded incentives can be specifically targeted to lower income/energy poverty clients • If capital is capped at \$8.5 million, with an average loan of 30K, would allow for 283 loans over the program’s 3 – 4 year time frame 	<ul style="list-style-type: none"> • Can select different repayment schedules = 5/10/15/20 year terms (monthly payments of \$272/\$137/\$91/\$45 for 11 months of year) • Longer term pay backs can significantly improve the ability of these programs to meet lower income and energy poverty target audience. • Loans can be paid in full at any time without penalty 	<ul style="list-style-type: none"> • Approx.: \$ 560/year (conservative energy cost savings) • (Does not include escalating carbon price and building envelope savings will be there even beyond the time frame of the loan repayment) • Carbon price increases, increases in natural gas prices will support pay back of retrofit projects

Figure 11: Sample Homeowner Budget

Tay Valley Township Decision Points

Below is a summary of the decisions that Tay Valley Township Council will need to consider if a BetterHomes Tay Valley Township program is able to meet the eligibility requirements for a FCM CEF application and the selected program design that would be advanced.

Council Decisions

Capitalization	Will Tay Valley Township provide 20% of total program costs? The 20% will be allocated to loans and as such will be recoverable debt. If so, will the loan funds come from capital reserves, be borrowed from Infrastructure Ontario, or be borrowed from private capital. The amount of capital the municipality can contribute will determine how much incentives can be a part of the program and what the program budget will be. A loan contribution of \$2 million will enable a full \$10 million application from FCM.
Financing Mechanism	Is Tay Valley Township willing to use the LIC authorities' mechanism?
FCM CEF Application	Does Tay Valley Township Council approve staff to advance a FCM CEF application?
Program Delivery Model	Does Tay Valley Township want to work with a 3 rd party delivery agent?

Staff Design Decisions

Participant Verification	What level of financial verification will the program require?
Loan Loss Reserve	Will the program incorporate a loan loss reserve fund?
Coverage	Will the program have geographical/archetype eligibility requirements?
Incentives	Will the program provide incentives?
Eligible Measures	What measures will the program cover?

APPENDIX: TAY VALLEY TOWNSHIP'S MARKET AND HOUSING ARCHETYPE ANALYSIS