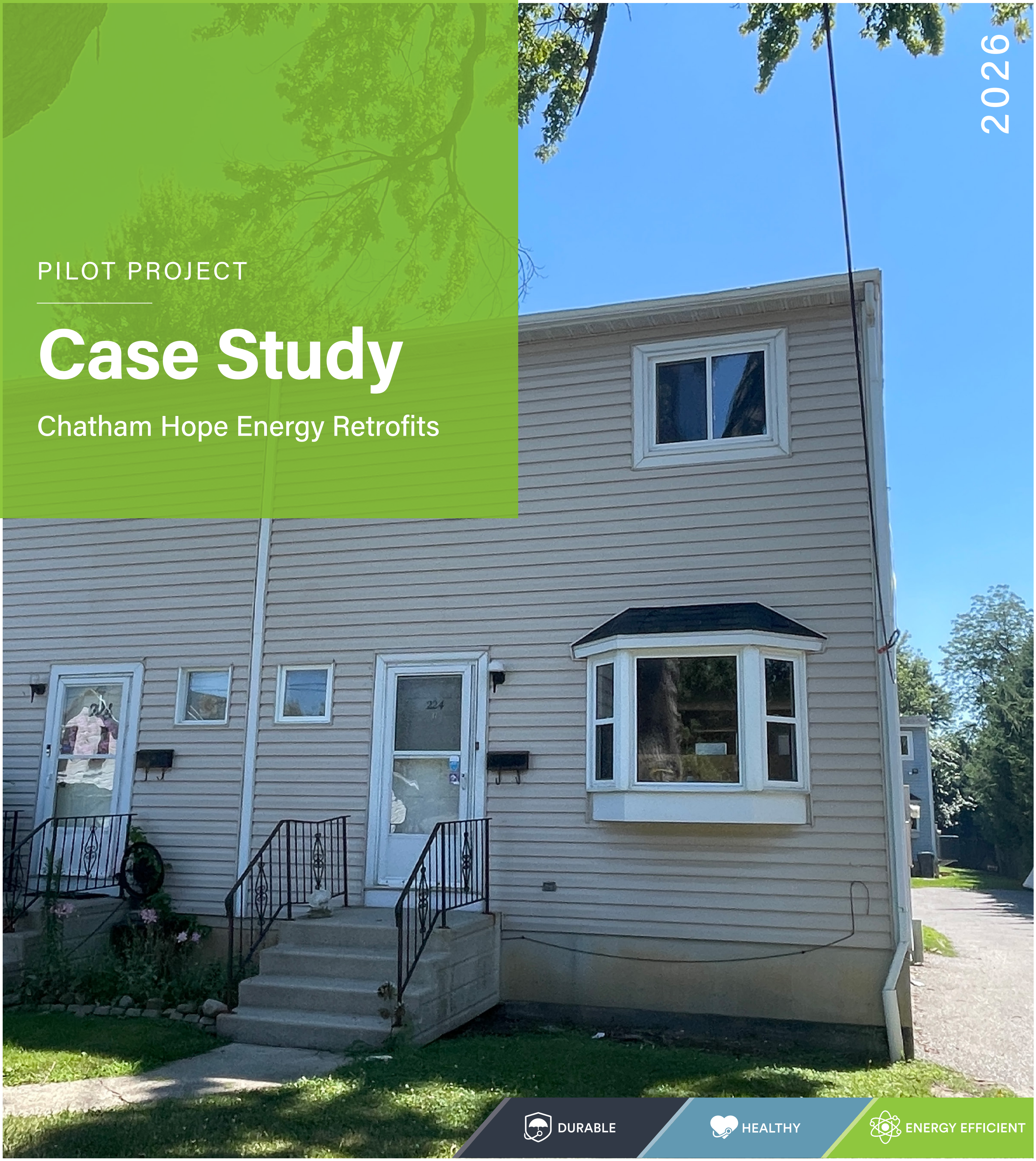
PILOT PROJECT

Case Study

Chatham Hope Energy Retrofits

2026



DURABLE | HEALTHY | ENERGY EFFICIENT

Building Knowledge Canada Inc.

Chatham Hope

TrimTab Energy Retrofits

Above: Row housing operated by Chatham Hope Non-Profit Housing Inc., in Chatham, Ontario. These townhomes were built in the 1980s and consist of 2-bedroom and 3-bedroom units.

Summary

Chatham Hope Non-Profit Housing Inc., an affordable housing provider, and Trim Tab, a start up energy contractor, partnered to test out an innovative approach to scaling up energy retrofits. They received innovation funding through the Federation of Canadian Municipalities and the Peter Gilgan Foundation to trial the approach on townhomes in Chatham, Ontario. The approach centres on the innovative use of technology and the well-timed intervention during unit turnovers. The result is deep decarbonization, quick turnarounds, and better tenant quality of life. This approach can potentially apply to a very large segment of low-rise housing across Canada.

An Innovative Approach

Affordable housing providers such as Chatham Hope experience tenant changeovers in their rental units on a periodic basis. Having the occupants and contents absent from a unit presents a unique opportunity to integrate energy retrofits with the renovations that typically occur during a “turnover”. The core concept being tested in this pilot project was whether units could be air sealed to the ENERGY STAR® standard during the turnover window without having to undertake an extensive and lengthy renovation.

[1] https://www.petergilganfoundation.org/grant-recipients/environmental-grants/

Impacts on Tenant Quality of Life

"The air quality is much improved. I live with my sister, and we both have severe asthma. We need to be cautious about the air we breathe. We can live and breathe in our unit without having to constantly use our inhalers. The place doesn't smell like smoke like other places we have rented. We have lived in rentals all our lives."

Victoria

"We love it here. It gets stuffy in here sometimes, but when the ventilator kicks on, it clears it up. In the summer, the air conditioner can quickly cool the house. In the winter, the place holds its heat well. It's energy efficient. The renovator did an excellent job."

Abby

"My previous rental unit didn't have any energy retrofits whatsoever, so in comparison, this current rental unit is much better for a very comfortable living environment and is more energy efficient. Especially, during the winter, because it actually is warm with the heat staying in the townhouse, and the cold air from outside doesn't seep into the unit like my previous place. I find it easier to knit in the wintertime."

Courtenay

An Ambitious Air Sealing Goal

With the unit vacant during a turnover, there was an initial focus on comprehensive air sealing. Doing so reduces the heating load, which increases the proportion of the heating load that can be served by a heat pump. Comprehensive air sealing also reduces the infiltration of dust, smoke, bugs, and moisture.

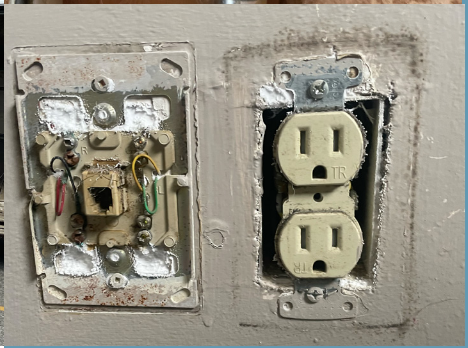
Retrofit air sealing is traditionally a case of trying to make marginal improvements relative to baseline conditions. Utility and government programs typically incentivize a percentage improvement that is in the order of 10-20%. Instead, **this project set an ambitious goal of achieving an absolute air sealing target regardless of the baseline conditions of the unit.** For the attached housing that comprises the Chatham Hope portfolio, the goal was to get all retrofits to ENERGY STAR performance or better.

The importance of air sealing: Getting to the root cause of air leakage might be the most important part of the process, as it uncovers issues that get worse with time if left unaddressed.

An Innovative Process

To achieve this ambitious goal within the context of a unit turnover, it is important to establish a repeatable process. The innovative aspect of this work is the development of a comprehensive air sealing process that combines conventional methods with AeroBarrier® to achieve dramatic reductions in envelope air leakage without undertaking an extensive renovation. It is the middle ground between simple weatherization measures typically promoted by utility programs and a full-scale Net Zero renovation.

Above: Finding and addressing the major sources of air leakage take priority. Basement headers are are a common example.



Using AeroBarrier in a retrofit scenario is one of the innovative aspects of this project. It is the process of releasing a non-toxic, aerosolized sealant under pressure. It results in sealing of the many cracks and gaps that cannot be completed manually.

Air Sealing Process Steps

The process has 7 steps as outlined below. Partnering with an experienced energy advisor is essential.

Above: Trim Tab performed a pressurization test with a fogging machine to identify major sources of air leakage.

Step 1: **Test In**

- Complete an envelope air leakage test. This provides a baseline measurement that you can compare to after the retrofit is complete.
- Use the blower door to investigate your major sources of air leakage.
- A fogging machine is advantageous if you are going through a tract of housing where issues are expected to be the same from unit to unit.

Step 2: **Safety**

- Remove atmospherically vented appliances. Replace with electric appliances or fuel-fired appliances with sealed combustion.
- Power vented equipment is recommended to be replaced because it creates negative pressures in the basement, drawing in cold air from outside.

Step 3: **Surgical Tear Down**

- Perform some targeted teardown to get to the root cause of air leakage issues.
  Examples:
  - Pull off the baseboards and pull up the carpet.
  - Remove window trim if there's evidence of air leakage.
  - Expose basement walls around windows and rim joists.

Step 4: **Manual Sealing**

- Attention to details matters here, and air sealing details depend on the issue.
  Examples:
  - Spray foam rim joists.
  - Properly seal an overhang with no previous air barrier.
  - Replace exhaust hoods with ones containing a spring return damper.
  - Encapsulate open sump pits.
  - Gasket and latch the attic hatch.
  - Replace a bad door or window.
  - Flash and foam attic and wall penetrations

Step 5: **AeroBarrier**

- Cover all finished horizontal surfaces and intentional openings.
- Leverage existing demolition to streamline the preparation for AeroBarrier (e.g. perform after painting but before trim and new electrical devices).
- Run the AeroBarrier process, ensuring neighbouring units temporarily vacate.

Step 6: **Fresh Air System**

- Install an Energy Recovery Ventilator (ERV) to provide a controlled source of fresh, tempered air.
- In homes with existing forced air distribution, interlock the ERV with the air handler.
- An ERV with autobalancing is recommended to ensure the balanced exchange of stale air with fresh air over time.

Step 7: **Test Out**

- Complete a final airtightness test and compare to the baseline result to assess improvement.
- Compare results to existing airtightness standards.

Successful Results, Independently Verified

12 units within the Chatham Hope portfolio went through this process throughout 2024-2025. These units were built in the 1980s and are close to 40 years old. The initial unit was extensively tested (using theatrical fog) to uncover significant air leakage issues that would turn up in all the units. All units initially tested in the range of 4-6 air changes per hour at 50 Pascals (ACH50).

Testing out post-retrofit, all units met or exceeded ENERGY STAR performance of 3.0 ACH50 or less. Several units met or exceeded CBHA Net Zero performance of 2.0 ACH50. The testing out results were independently verified by Building Knowledge Canada. The results are shown below in Chart 1.

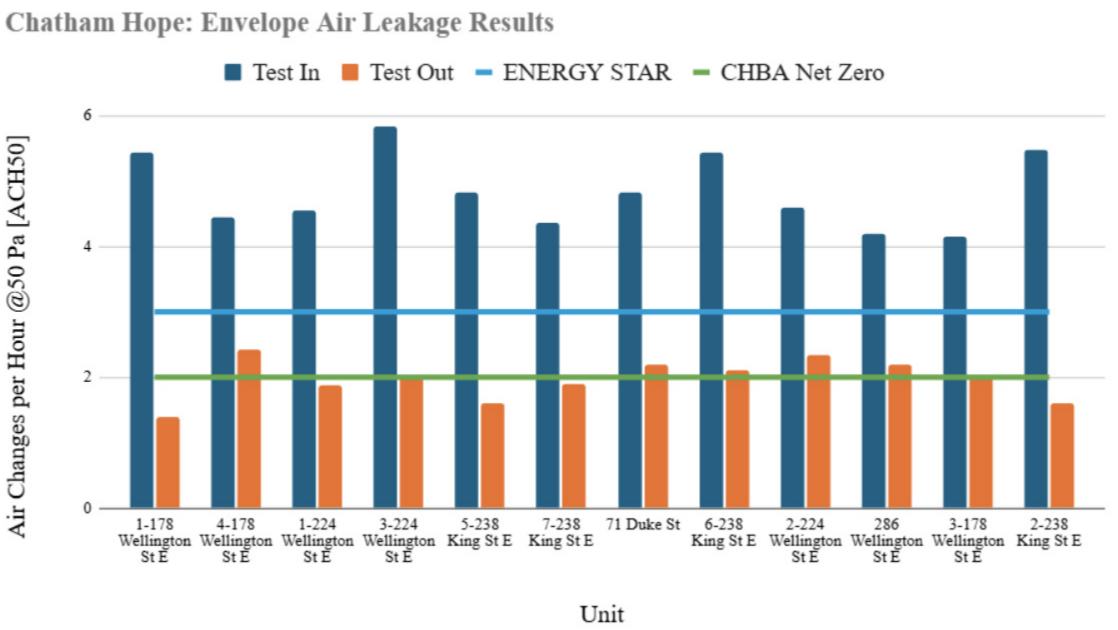


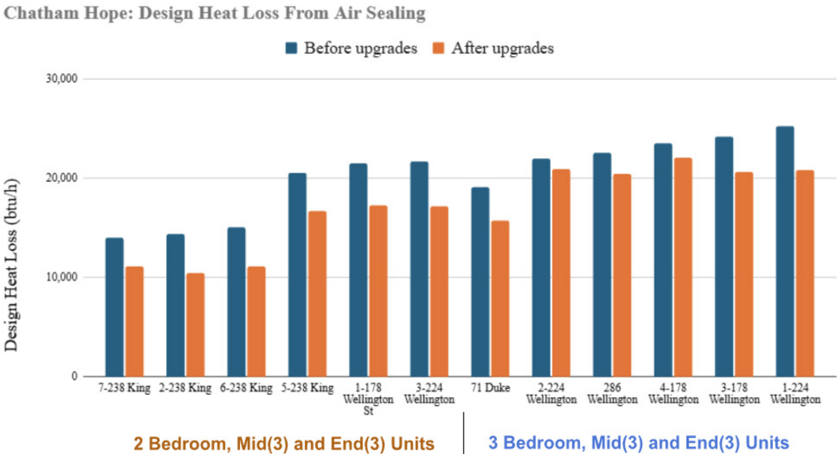
Chart 1: Improvements in envelope airtightness for each retrofit unit.

Enabling Electrification

Significant reductions in air leakage led to meaningful reductions in the design heat loss of the units. Reductions in heat loss mean that a heat pump, appropriately sized for both heating and cooling, can take a “bigger bite” out of the winter heating load because it can operate to a lower temperature before utilizing an auxiliary source. For the Chatham Hope units, new hybrid heating systems were installed in each unit, consisting of an ENERGY STAR heat pump with a backup natural gas furnace.

Energy modelling in HOT2000 shows that the improvements in envelope airtightness yield a design heat loss reduction from 1,000 to 4,500 Btu/h, or 6 - 27%. These improvements meant that the switchover temperature from heat pump to furnace could be set to a lower temperature than it otherwise would be. The switchover temperature of these units were set at 0 degrees Celsius, to balance affordability with carbon reduction.

Electrification enables better tenant quality of life in two important ways: first, through the introduction of central air conditioning, and second, through the introduction of balanced mechanical ventilation.



Above: Reductions in design heat loss by unit, which resulted from improvements in envelope air tightness.

New mechanical systems: New ERV, furnace, heat pump, and water heater. A resistance water heater was chosen to replace the existing gas-fired power vented water heater because of cost, comfort, and reliability.

Turnaround Times are 1-2 Months

It is a major advantage not to have to work around tenants and their belongings—it reduces stress on everyone and makes the work considerably easier and more cost effective. Empty units also proved to be a good training ground for apprentices as they provide the space for peer-to-peer learning.

However, downtime is lost revenue for housing operators, so it's important to get in and out quickly. Integrating the energy retrofits with the typical renovation activities that accompany turnovers—painting and repair, for example—requires changing the typical sequence of work so that technologies such as AeroBarrier can be efficiently deployed.

Chart 2 shows the trend of incremental turnover time throughout the project. Incremental turnover time represents the extra time added to the turnover process that results from the incremental energy retrofit activities. By the end, the turnover time reached 40 days, with the best result being 30 days. For rent-geared-to-income units, this represents a very small loss in revenue for the housing operator.

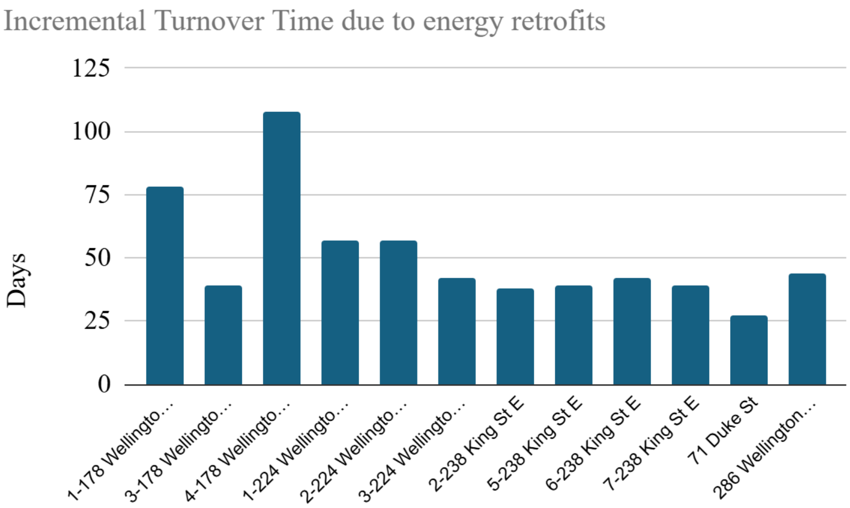
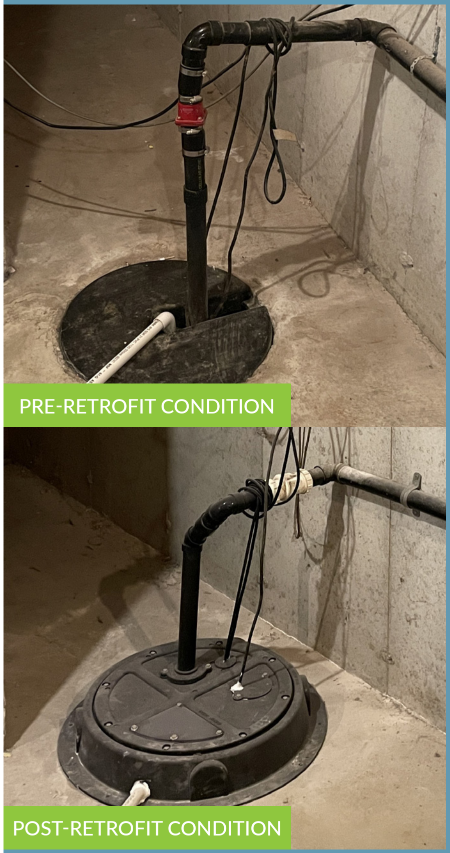


Chart 2: Turnover times for each unit that underwent an energy retrofit. This represents the time between when the property manager handed over the unit to Trim Tab and the time that Trim Tab handed the unit back to the property manager.

Above: Turnovers provide a great learning environment for apprentices.



Above: Details are important when it comes to air sealing. In this example, open sump pits were retrofit with a dome to be made air tight and reduce exposure to radon gas.

Eliminating a Bill for Tenants Ensures Greater Affordability

Chatham Hope tenants pay for their own natural gas and electric utilities and rent their water heater. The retrofit strategy of "seal-ventilate-electrify" decreased natural gas usage and increased electrical usage.

Trim Tab verified savings through side-by-side comparisons of units, where one unit represented baseline conditions, and the other retrofitted. This was the chosen method because historical energy bills are not available when units turn over. Several comparisons remain under evaluation. Two cases where we have an excess of 12 months of data are provided in Tables 1 and 2.

Analysis

In both cases, the retrofitting did not lead to lower utility costs. In both cases, the combined gas and electricity charges were marginally higher in the retrofit units. There may be several possible reasons for this:

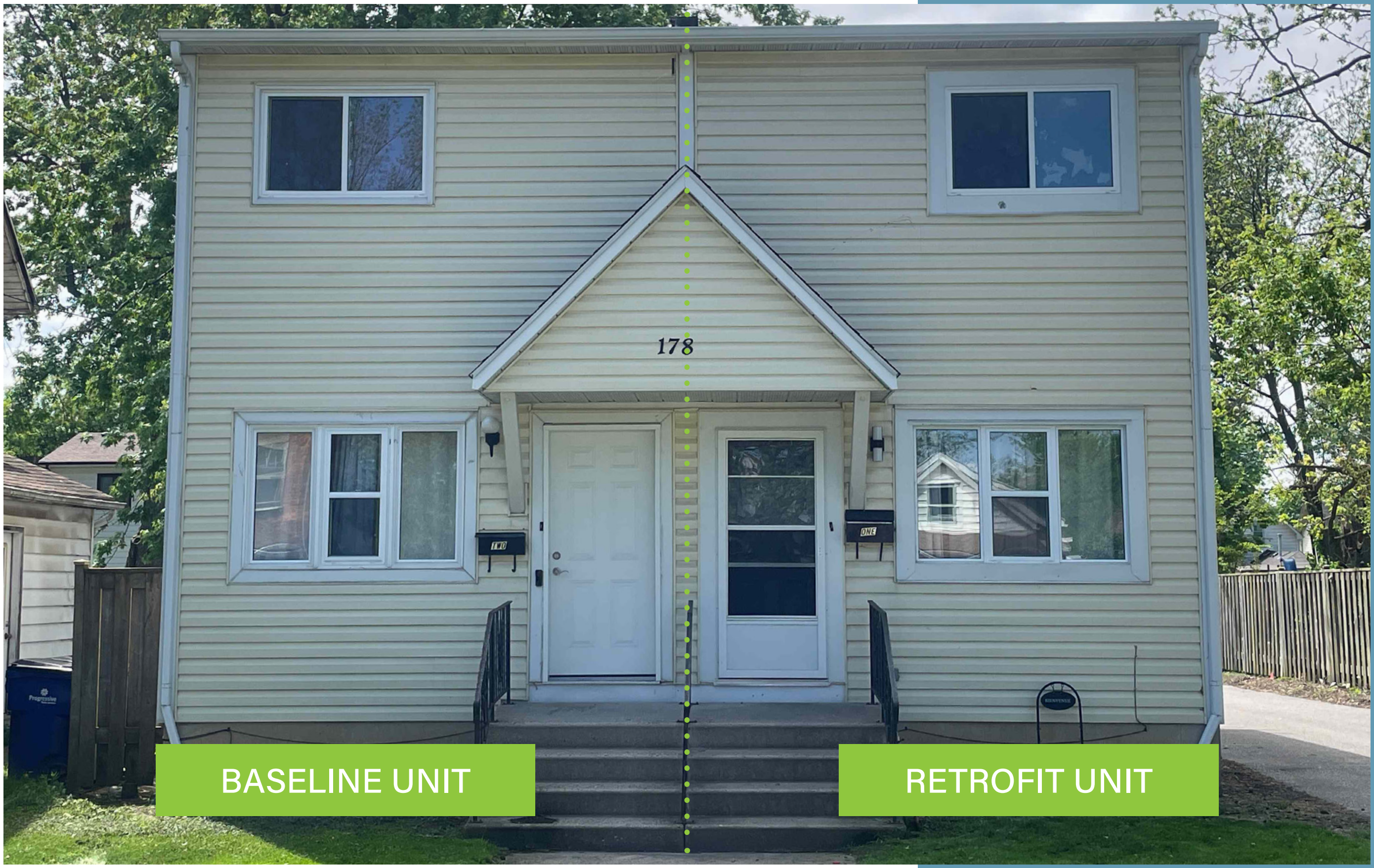
1) Efficiency gains are offset by energy use increase to improve tenant quality of life (e.g., the addition of balanced mechanical ventilation and cooling).

2) Occupancy behaviour (e.g. it was noticed that the tenant of the baseline unit in one of these comparisons set her thermostat at much lower temperatures in the winter).

3) The heat pumps utilized in this project, which were not cold-climate rated, increased operating costs during low temperature operation.

The financial benefit for tenants has been achieved through the elimination of rental water heaters. Chatham Hope supported the buy-out of the existing gas water heaters so that they could be converted to electric tanks that would be maintained by the property manager going forward. This resulted in the elimination of a monthly bill with a fixed charge of about $40. Overall, the elimination of a rental bill far outweighs a slight increase in utility costs. Tenants in retrofits units, in these two examples, are now saving $27-$38 per month.

Operating carbon reduction averages to 50% for these two examples and on-site energy reductions average to 20.5%. These are actual results and were not weather normalized.



	Baseline	Retrofit
Natural gas (variable charges)	$ 348.70	$ 113.72
Electricity (variable charges)	$ 371.60	$ 766.84
Water heater rental	$ 478.94	-
Total costs:	**$ 1,199.23**	**$ 880.56**
Cost savings over 12 months:		**$ 318.67**

Source: natural gas	1.6	0.5
Source: electricity	0.1	0.3
Total GHGs:	1.7	0.8
GHG reductions over 12 months		**54%**

GJs of natural gas:	31.1	10.1
GJs of electricity:	12.7	26.3
Annual energy consumption:	43.8	36.4
Energy reduction over 12 months:		**17%**

Table 1: Side-by-side comparison of actual energy use, GHG emissions and operating costs over the period of September 2024 to August 2025. Units are 2-bedroom end units with 1200 sq. ft of heated floor space.

	Baseline	Retrofit
Natural gas (variable charges)	$ 500.05	$ 236.64
Electricity (variable charges)	$ 342.59	$ 630.12
Water heater rental	$ 478.94	$ 0.00
Total costs:	**$ 1,321.58**	**$ 866.76**
Cost savings over 12 months:		**$ 454.82**
Source: natural gas	2.3	1.1
Source: electricity	0.1	0.2
Total GHGs:	2.4	1.3
GHG reductions over 12 months		**46%**
GJs of natural gas:	44.5	21.1
GJs of electricity:	11.7	21.6
Annual energy consumption:	56.3	42.7
Energy reduction over 12 months:		**24%**

Table 2: Side-by-side comparison of actual energy use, GHG emissions and operating costs over the period of November 2024 to October 2025. Units are 2-bedroom end units with 1200 sq. ft of heated floor space.

Low Capital Costs

The per-unit capital costs of this project are provided in Table 3 and focus only on the incremental turnover costs associated with air sealing, ventilation, and electrification. The air sealing costs vary from unit to unit (e.g., the need to replace a door), so a cost range was established, and we provide the high and low ends in Table 3. The project benefited significantly from rebates: the heat pump costs were significantly rebated through the Canada Greener Homes Grant, and envelope upgrades were funded through the Enbridge Gas Home Winterproofing Program.

Above: The attic hatch is traditionally a source of significant air leakage. This is called "latching the hatch."

	Low End of Cost Range	High End of Cost Range
Retrofit costs (HST included)	$ 30,035.40	$ 35,343.01
Tax & Program Rebates	- $ 12,276.51	- $ 12,873.09
Total:	**$ 17,758.89**	**$ 22,469.92**

Table 3: Capital costs for each unit, before tax and rebates.

The turnovers incorporated repair and resilience to ensure units are safe, healthy, durable, and energy efficiency gains persist over time. Repair costs varied significantly from unit to unit, but the average overall cost of each turnover, after tax and rebates, was approximately $40,000. This is **considerably cheaper** than the per-unit costs of deep energy retrofits which typically includes expensive building envelope overhauls., while still achieving substantial reductions in GHG emissions and improvements to tenant quality of life[3].

[2] https://www.cmhc-schl.gc.ca/professionals/project-funding-and-mortgage-financing/funding-programs/all-funding-programs/canada-greener-affordable-housing-program/retrofit-funding

[3] https://www.canada.ca/en/natural-resources-canada/news/2025/03/canada-invests-in-deep-energy-retrofits-for-affordable-housing-in-hamilton.html

Next Steps

Trim Tab will be releasing an educational video for renovators and designers on the air sealing process developed from this pilot project.

BUILDING KNOWLEDGE CANADA INC. — buildingknowledge.ca

CHATHAM Hope

TrimTab Energy Retrofits — trimtabretrofits.com

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