



Building Stronger Communities Together
Bâtir ensemble des communautés plus fortes

JULY 2015

OCH PROPERTIES

Four townhouse communities were targeted for weatherization retrofit repairs: Morrison Gardens, Albion Gardens, Albion Heatherington and Foster Farms.

The communities were constructed between 1970 and 1974, and each contain between 124 and 209 units, for a total of 611 units across the four sites (Table 1). Each site had uninsulated basement walls and exposed first floor framing, that is, the perimeter header above the foundation walls was either lightly insulated or uninsulated.

The program focused on retrofitting the uninsulated basement walls and headers as well as applying air sealing measures on all penetrations through the basement walls and first floor framing which are typically unsealed, contributing to cold basements and complaints of cold drafts.

OCH CASE STUDY

WEATHERIZATION AND AIR SEALING

“It Saves Energy, Improves Tenant Comfort and Enhances Building Stock”

THE OPPORTUNITY

Ottawa Community Housing (OCH) had an opportunity to save energy, improve the building conditions and enhance tenant comfort in its townhouse communities by retrofitting uninsulated and poorly sealed basement walls.

OCH took advantage of an Enbridge Gas incentive program to implement weatherization projects across multiple communities. The Enbridge Gas Home Winterproofing Program aims to improve energy efficiency through weatherization retrofits in social housing communities that are heated using natural gas.



Table 1: Site Information and Project Costs at Morrison Gardens, Albion Gardens, Albion Heatherington and Foster Farms

Site	Number of Units	Number of Units Retrofitted	Total Project Cost (\$)	Average Cost per Retrofitted Unit (\$)
Morrison Gardens	129	90	\$145,487	\$1,616.52
Albion Gardens	124	88	\$115,510	\$1,312.61
Albion Heatherington	149	94	\$130,759	\$1,391.05
Foster Farms	209	168	\$297,335	\$1,769.85
TOTAL	611	440	\$689,091	



WEATHERIZATION AND AIR SEALING

THE PROCESS

THE PROCESS

Mock-up retrofit projects were completed at several units in each community in order to estimate the potential for energy efficiency improvements. Following the mock-ups, a comprehensive program was implemented within the four communities. The retrofit program was completed in three phases, as described below. Access and entry into each unit was required for each phase.

PHASE 1:

Energy auditors hired by Enbridge's service provider EnviroCentre assessed existing conditions and conducted pre-retrofit audits. This included a visual review and blower door test to identify air leakage paths. Units with water infiltration concerns, foundations requiring maintenance repairs or tenant-finished basements were not upgraded as part of this program. As a result, approximately 75% of the units at each community participated in the retrofit program. The information gathered during the pre-retrofit audits was then used to model and estimate energy savings potential.

PHASE 2:

Contractors applied insulation to the exterior basement walls and sealed plumbing and ventilation stacks, as well as other penetrations where air leakage was identified during the pre-retrofit audit. A layer of R12 fiberglass insulation sandwiched between a moisture/vapor barrier was affixed with anchors to the basement walls from the top of the foundation wall to approximately 300 millimeters above the basement floor. No finishing was applied as the basement is considered storage space. The headers were sealed and insulated to R20.

PHASE 3:

The blower door test was repeated and results were used to model the energy savings from the insulation and sealing. Auditors confirmed that all issues identified during the pre-retrofit audit had been addressed.



WEATHERIZATION AND AIR SEALING

THE RESULTS AND LESSONS LEARNED

THE RESULTS

In the 12 months prior to the retrofits, Morrison Gardens, Albion Gardens, Albion Heatherington and Foster Farms consumed approximately 1.49 million cubic meters of natural gas.³ In the 12 month period following the retrofits, annual natural gas consumption decreased to 1.24 million cubic meters across the four communities (Figure 2).⁴ This represents an average natural gas savings of 16% and an estimated \$91,000 in cost savings (Table 3). This is equivalent to natural gas savings of 466 to 650 cubic meters per unit.

NATURAL GAS SAVINGS

16% = EST. **\$91,000**
IN COST SAVINGS

Figure 2: Natural Gas Consumption at Morrison Gardens, Albion Gardens, Albion Heatherington and Foster Farms

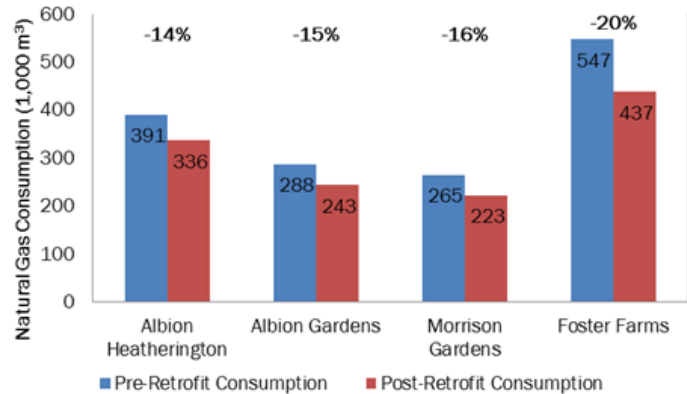


Table 3: Natural Gas and Cost Savings, and ACH Reduction at Morrison Gardens, Albion Gardens, Albion Heatherington and Foster Farms⁵

Community	Natural Gas Savings (m ³)	Cost Savings (\$)	Natural Gas Savings Per Unit (m ³ /unit)	Air Change Per Hour (ACH) Reduction (units?)
Morrison Gardens	42,000	\$15,000	466	0.11
Albion Gardens	44,000	\$16,000	504	0.08
Albion Heatherington	54,000	\$20,000	578	0.08
Foster Farms	109,000	\$40,000	650	
TOTAL	249,000	\$91,000		

³ Pre-retrofit consumption is based on the following periods, and is normalized for weather:

Morrison Gardens – September 1, 2011 to August 31, 2012, Albion Gardens – January 1, 2012 to December 31, 2012, Albion Heatherington – March 1, 2012 to February 28, 2013, Foster Farms – July 1, 2012 to June 30, 2013

⁴ Based on October 1, 2013 to September 30, 2014 data for all four sites, normalized for weather.

LESSONS LEARNED

This retrofit project highlights the importance of supportive partners. In addition to providing a financial incentive to minimize OCH's costs, Enbridge supplied contractors and other service providers to handle project logistics, conduct pre- and post-retrofit audits, complete energy modeling and prepare fact sheets. OCH found that the project benefited from regular oversight and coordination with the contractors given the work taking place within tenants' homes and the variation in conditions being addressed.

Communities were informed of retrofit status by flyers, and tenants received specific notices 24 hours in advance of each entry into their units. To minimize disruption, property managers

coordinated their entries with unit visits being performed for other purposes. Maintenance staff were also helpful in recommending optimal entry times based on their familiarity with tenants' schedules.

In addition to natural gas and cost savings, the biggest success of the weatherization projects was increased tenant comfort. Effective insulation and sealing eliminated drafts and contributed to warmer and more consistent indoor air temperatures in the winter. Post-retrofit follow-up has revealed that tenants are more satisfied with the warmth and comfort of their units.

WEATHERIZATION WITH FURNACE REPLACEMENTS

BANFF LEDBURY AND BRITANNIA WOODS

In 2008 and 2009, OCH undertook renovation work at two townhouse communities: Banff Ledbury (a 118-unit community) and Britannia Woods (a 179-unit community). At Banff Ledbury, OCH was undertaking work to remove asbestos in the walls. They took the opportunity to upgrade the building envelope by replacing windows and applying spray foam to exterior walls. They also replaced atmospheric furnaces with high efficiency furnaces across the entire community. At Britannia Woods, in contrast, OCH focused on the needs of each unit, only replacing windows and upgrading insulation where necessary. However, each unit did receive comprehensive air sealing, with caulk and foam, as well as a new high efficiency furnace replacing an atmospheric furnace.

The retrofit approach at Banff Ledbury resulted in an overall natural gas savings of 18%. The more focused retrofit at Britannia Woods had a lower cost and yielded a natural gas reduction of 14% after the retrofit (Figure 1).¹ In the 12 month period after the retrofits were completed at these two communities, OCH noted average savings of about 400 to 500 cubic meters of natural gas per townhouse unit. This was equal to a cost savings of approximately \$50,000 for both projects (Table 2).

While the energy savings from weatherization cannot be isolated from the furnace replacements at Banff Ledbury and Britannia Woods, OCH anticipated that weatherization alone would be more cost effective, yield valuable savings, improve tenant comfort and protect the building envelope.

Table 2: Natural Gas and Cost Savings at Banff Ledbury and Britannia Woods²

Community	Natural Gas Savings (m ³)	Cost Savings (\$)	Natural Gas Savings Per Unit (m ³ /unit)
Banff Ledbury	60,000	\$22,000	511
Britannia Woods	78,000	\$28,000	434
TOTAL	138,000	\$50,000	

- 1 Pre-retrofit consumption at Banff Ledbury is based on March 1, 2007 to February 28, 2008 data, and is normalized for weather. Pre-retrofit consumption at Britannia Woods is based on December 1, 2008 to November 30, 2009 data, and is normalized for weather. Post-retrofit consumption at both sites is based on October 1, 2013 to September 30, 2014 data, and is normalized for weather.
- 2 Cost savings are based on an average 2014 natural gas rate of \$0.36/m³.

Figure 1: Natural Gas Consumption at Banff Ledbury and Britannia Woods

