Final Report: Continuous Improvement Fund Project # 125

Multi-residential Recycling: Implementing Best Practices in the City of Sarnia

August 2013

CIF CONTINUOUS IMPROVEMENT FUND

SARNIA SEMPER

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Acknowledgement:

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Executive summary

This is the final report of a project implemented by the City of Sarnia in 2010. The project goal was to increase recycling rates by implementing best practices in the municipal multi-residential (MR) recycling program. Waste Diversion Ontario - Continuous Improvement Fund (WDO – CIF) provided financial and technical assistance. Municipal staff completed the project work.

Sarnia provides blue box recycling to 40,700 households, including an estimated 10,600 households in multi-residential buildings (2009 Datacall). The number of multi-residential buildings provided with municipal recycling service increased from 138 to 161 during this project, a 12% increase. This represents a corresponding increase in terms of residential units from 7509 to 7792. The best practices that were implemented during this project included:

- Creating a database of multi-residential properties
- Evaluating the recycling performance of individual buildings
- Estimating the overall program recycling rate
- Increasing the number of recycling containers at buildings
- Distributing new promotion and education materials to residential and building staff

Additional work included in this project was the design and production of large recycling area signs for each building.

Based on visual audits completed at each building, it is estimated that the average recycling rate at buildings was approximately 60 kg/unit before the implementation of the project, and at 75 kg/unit after implementation. Approximately 500, 360 litre (95 gallon) recycling containers were added to the program, increasing the recycling capacity from 34 litres per unit to the best practices goal of 50 litres per unit. It is estimated that implementing best practices had the effect of increasing recycling by 25% from 60 kg per unit to 75 kg per unit.

The cost to complete the project is estimated at $118,000. Sarnia was approved for funding up to $59,000, or 50% of the cost from the Continuous Improvement Fund. The estimated return on investment of the CIF portion is under 7 years.

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Introduction

The City of Sarnia is located in South western Ontario located on the south shore of Lake Huron. It is home to approximately 75,000 88,790residents. Sarnia provides Blue Box recycling services to approximately 40,700 households, including 10,600 households in multi-residential buildings. The goal of this project was to increase the recycling rate in the multi-residential sector. Objectives included increasing the number of buildings recycling, increasing the number of recycling carts, building partnerships with property managers and owners, and increasing the level of awareness and commitment to recycle by residents. This project is part of an overall strategy to increase residential recycling in Sarnia. Other projects are underway with the support of the Continuous Improvement Fund.

Background: provision of waste management services to multi-residential buildings

By-law 62 of 2006

The City of Sarnia provides a waste collection program for apartment buildings under conditions set by municipal by-law (By-Law 62 of 2006). Property owners may apply for collection of garbage, recycling, and bulk items (including white goods). Under the program, the following conditions apply:

- The City issues a tender for collection services and selects the successful contractor(s) as service provider(s).
- Property owners are responsible for arranging for containers and collection and for all associated costs of garbage of bulk and white goods collection, based on the terms of the tender.
- Property owners are required to establish a recycling program and participate in the weekly collection of recyclables provided and required to purchase 360 litre-recycling carts.
- The pays all costs associated with recycling collection so that there is no service fees for recycling collection.
- Recyclables are not permitted in garbage containers. Garbage bins may be refused collection if they contain recyclables.

Sarnia's Waste By-law provides a framework to encourage property owners to reduce their garbage and increase recycling. Property owners that understand and work toward this will be rewarded with lower waste management costs. The by-law also provides Sarnia with the ability to refuse to collect garbage bin containing recyclables.

Blue Cart recycling program

The details of Sarnia's recycling program for apartment buildings are outlined below:

- 165 buildings of 6 plus units
- 10,600 residential units
- The average building size is 64 units
- 26% of all households are in multi-residential buildings
- Compared to other similar size municipalities, Sarnia has approximately the same percentage of MR units (26% compared to 25%). Sarnia average building size is larger than the average – 64 units per building – compared to 49 units on average for similar sized municipalities. (Table 3.1, below)
- Recycling is collected in 360 litres carts, which are purchased by the building owner. Carts are purchased from the City as cost. Prior to this project, carts were sold for $125 each, including delivery.
- For this project, carts were purchased through a municipal cooperative tender at a substantially reduced cost. Combined with the CIF grant Sarnia was able to sell carts at $30 to property owners.
- Two stream program – recyclables are collected by Emterra Environmental and processed at their MRF in London.
- Collection of recyclables takes place five days per week and each building receives weekly collection.
- For 2008 to 2009, MR buildings were collected on a specific route, however because of frequent cross-overs of this and curbside routes, data specific to MR tonnes is not available and this report uses data based on visual audits completed during site visits. From 2011, MR recyclables were collected with the same trucks used to collect the curbside Blue Box program.

Table 3.1: Multi-residential households & number of buildings
(Sarnia and comparator municipalities (2009 WDO Datacall & CIF data)

Program	Households	MR Households	Percent MR	Buildings	Units/building
North Bay	23,300	5,500	24%	175	31
Sault St Marie	33,708	9,943	29%	250	40
Brantford	38,798	12,894	33%	142	91
Peterborough	34,632	8,658	25%	148	59
Sarnia	40,700	10,610	26%	162	65
Kingston	50,299	12,021	24%	178	68
Thunder Bay	49,069	10,784	22%	220	49
Guelph	44,993	6,206	14%	277	22
Barrie	53,408	9,102	17%	280	33
Sudbury	62,188	13,781	22%	400	34
Average	43,110	9,950	24%	224	49

Table 3.2 shows further details on buildings with and without recycling service. The table shows that buildings that do not recycle are on average smaller buildings compared to buildings that do provide recycling.

Table 3.2: Number of multi-residential buildings and units with municipal recycling service (July, 2010)

2010 data	Buildings	Units	Average # of units per building
Total	162	8,072	50
With recycling	138	7,509	55
Without recycling	24	563	24
% Recycling	85%	93%	

The percentage of buildings increase by 12% as a result of the project as indicated in Table 3.3. It is expected that this will increase further as work in this sector continues.

Table 3.3: Multi-residential recycling before and after project

Activity Recycling	Before project July 2009	After project August 2011	% change
Buildings that are actively recycling	138	154	12%
Units with recycling	7,509	7,822	4%

Table 3.4 provides an overview of recycling quantities before and after additional carts were provided to buildings performance measures.

The project scope

The project scope included four main phases:

- Phase 1: Develop and maintain a database of buildings
- Phase 2: Benchmark recycling performance
- Phase 3: Increase recycling container capacity
- Phase 4: Provide promotion & education materials (resident flyers, signage)

Each of the phases is discussed in the following sections.

Phase 1: Develop and maintain a database of buildings

Creating and maintaining a database of all multi-residential properties is an important step towards implementing best practices. To obtain the list of multi-residential properties, a number of sources of data were used, including:

- Municipal departments (planning, taxation, technology services)
- Contacting property management companies by phone and email
- Site visits to each of the properties

Sources & collection methodology

Site visits to each building were completed to collect detailed information such as how well the recycling program is currently working, building characteristics that contribute to recycling challenges or opportunities (e.g., room for recycling bins), contact information for the on-site representative (e.g. superintendent) and the role that the on-site staff play in managing the building's recycling program.

During site visits the data was obtained through discussion with building staff and management as well as through observations made by the municipal project team. The City of Sarnia hired summer students to complete site visits to all buildings in 2010 and again in 2011. In both years many of the building received more than one site visit. The goal of the initial 2010 site visits was to establish:

- An electronic database of all buildings
- Contact information for property and building managers
- Building characteristics (number of units, property ownership – eg, condos, rentals)
- Recycling program details – number and location of carts, placement of additional carts and recycling signage, program challenges (contamination, stream mixing, accessibility, etc.)
- An estimate of how much was being recycled based on a one-time estimate of how much was in the containers

A second site visit was completed at the end of the summer in 2010 to distribute flyers and posters to all residential units. In 2011, staff (summer students) returned to all buildings for follow-up site visits.

Data collected was stored and organized in Microsoft Excel.

RFID technology

As part of the project requirement the recycling carts have Radio Frequency Identification (RFID) tags embedded in the handles. This provides for electronic tracking of carts for collection and maintenance purposes. While not part of the scope of this project, under a separate CIF project Sarnia will expand this technology to add RFID tags to all existing inventory of recycling carts. This will provide Sarnia with future capability to take advantage of a web-based cart-tracking program.

Summary and recommendation:

A complete database was successfully created, containing the data collected from site investigations from 2010 and 2011.As with all databases, its usefulness depends on depends on regular maintenance and updates to the information. With limited staff resources this may present a challenge. For that reason, it is recommended that this be included as part of the duties of contract, temporary, or summer staff member.

Phase 2: Benchmarking recycling performance

A key step in implementing program improvements is to benchmark current performance so that recycling targets can be established and program improvements can be tangibly measured.

Evaluating performance is a quantitative assessment that measures the following:

1) How much each building is recycling (kg/unit), and

2) How much is being recycled by all the buildings collectively.

Performance indicators such as container fullness and contamination were monitored during site visits. Performance data completed during site visits is an estimate only as it is not based on precise weights. However, if done consistently, research in other municipalities suggests that performance data has been found to be within 10-15% accuracy of actual weights. Obtaining this information from each building was instructive both for flagging low performing buildings and for highlighting top performers.

Procedure for estimating recycling rates

Based on waste audits and density audits, it is estimated that a 360-litre recycling cart will collect an average of one tonne of mixed recyclables each year. The following is assumed: collection is weekly, the carts are filled each week. This applies to both single-stream and two-stream programs. For two-stream programs, paper carts will collect more on average per year than container carts. The 'average cart' is the same for single or two stream programs, since the same basket of recyclables is being collected.

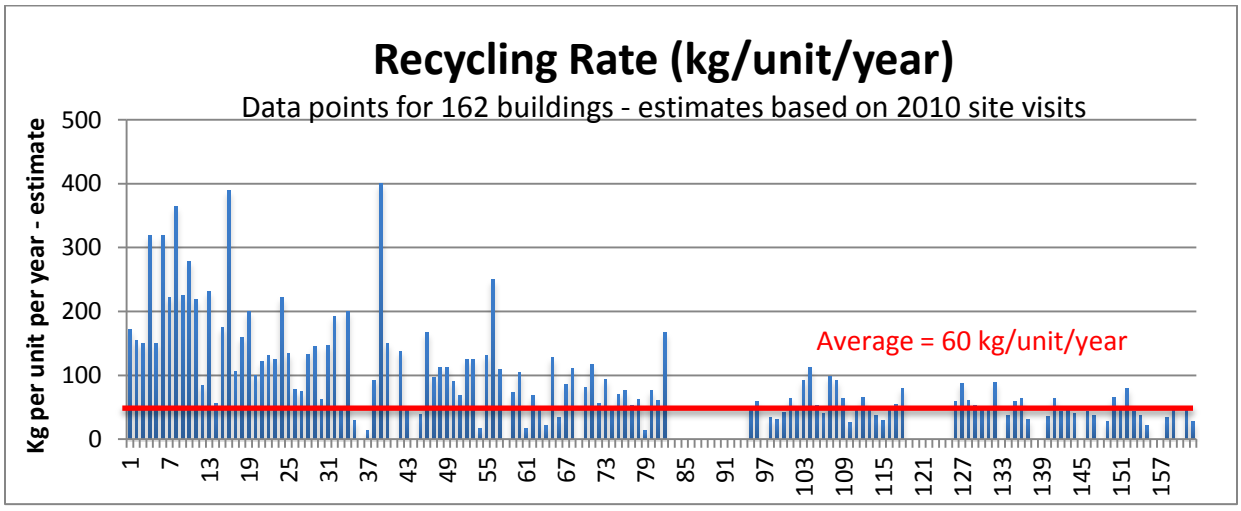
This guideline is used to estimate recycling rates for buildings based on a one-time assessment completed at a site visit. For example, a building with 7 and ½ full carts observed at a site visit (at the end of the 7-day collection

cycle) is estimated to recycle 7.5 tonnes per year. This and the number of units are used as a quick estimate of kg/unit/year.

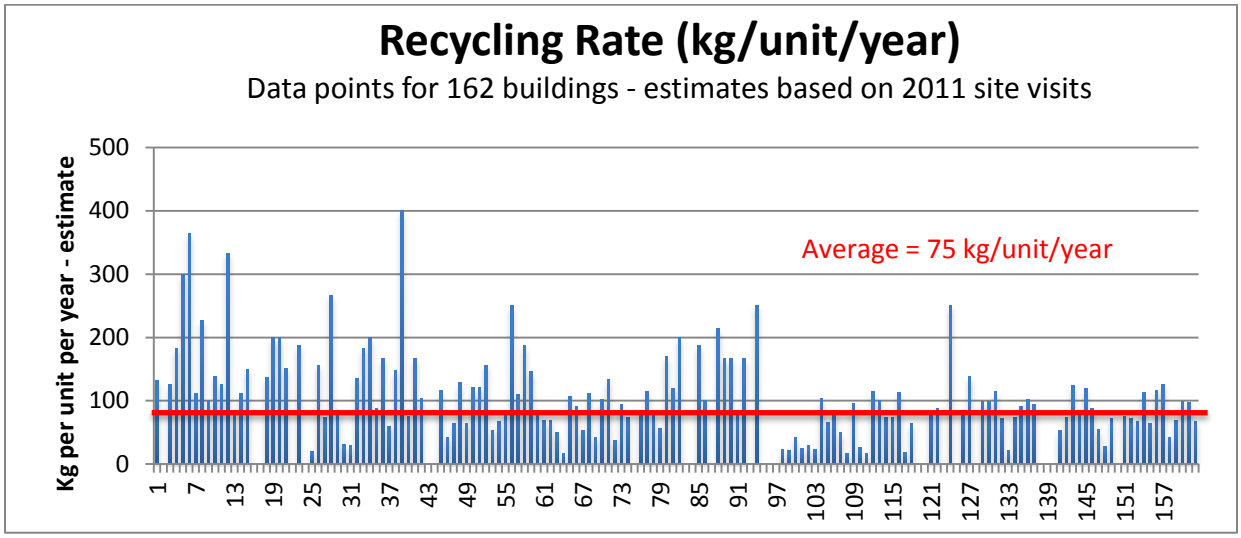
Recycling rate estimates

Tables 4.1 and 4.2 show the distribution of recycling rates (estimated kg/unit/year) based on estimates completed at visual site inspections at 162 buildings in 2010 and in 2011. The tables illustrate the distribution of recycling rates as well as average rates. It is important to note that the recycling rates are estimates based on visual inspections and represent a one-time assessment. Graph 4.3 provides the summary comparative information for the two data sets.

Graph 4.1: Building recycling rates, June 2010



Graph 4.2: Building recycling rates, June 2011



Graph 4.3: Summary of baseline (2010) and post-implementation (2011) recycling rates

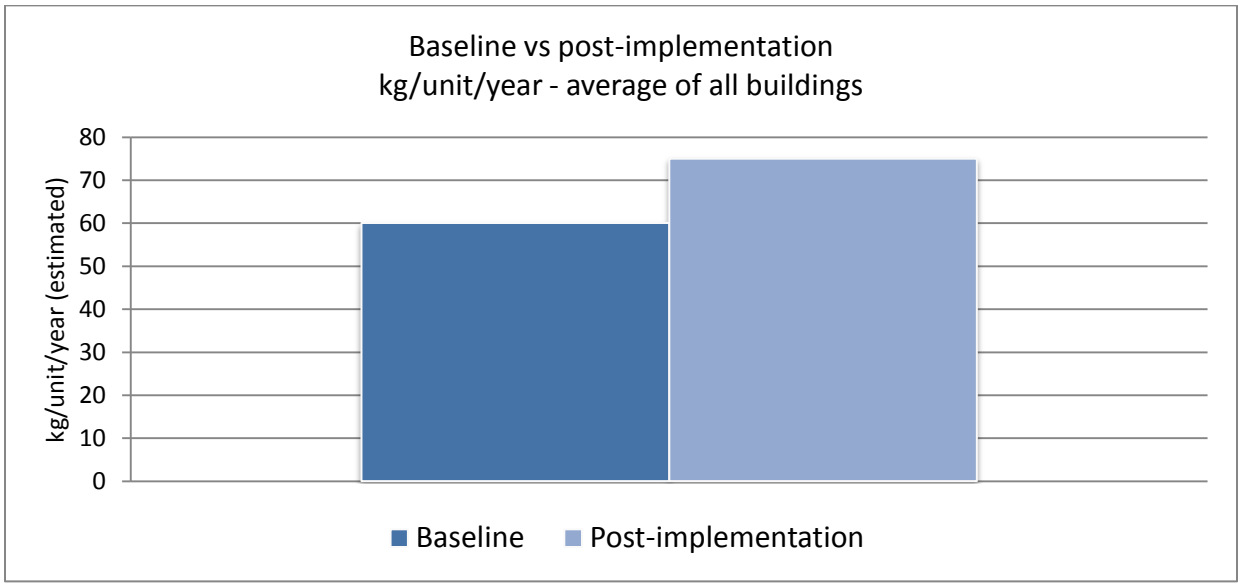


Table 4.4 illustrates the distribution of recycling rates from 'low' to 'high' of the buildings included in the audit over the two periods. It can be seen that there are fewer buildings in the 'low' category in the post-implementation period, and overall a general migration towards higher recycling rates. Criteria of what is considered 'low,' 'mid' and 'high' will vary over-time as recycling targets evolve.

Table 4.4: Distribution of buildings by recycling rates

Recycling rate Kg/unit/year		Baseline - 2010		Post-implementation - 2011	
Low	< 60	52	40%	28	20%
Mid	60 to 120	42	32%	66	47%
High	>120	36	28%	45	32%
Total buildings		136*	100%	139*	100%

* Note that the totals do not include all buildings with recycling programs, but rather collection points. In some cases, collection points are shared by more than one building.

Weigh scale data

Prior to 2011, Sarnia's collection contractor had designated multi-residential routes. However, because of route cross-over, the data is not just MR tonnes. In 2011, multi-residential buildings were collected with curbside households making it impossible to isolate tonnages from either program. Data for 2009 and 2010 is presented below, noting that it is only there is some mixing of tonnes between MR and curbside. The table shows that MR tonnes increased by 6% while the curbside increase for the same period was only 1%.

Table 4.5: Weight scale data MR vs Curbside

	Multi-residential	Curbside
2009	825	4,475
2010	880	4,515
% Change	6%	1%

Phase 3: Increase recycling container capacity

Having enough storage space for recyclables is one of the most critical factors in a successful recycling program and it is important to address this first before other program improvements are put in place. During Phase 2 site-visits the baseline container quantities were recorded and information was collected about where containers could be relocated within the building to provide more convenience to residents. Site visits also provided the opportunity to determine if additional containers were required and where additional containers would be stored and ultimately used.

Type of recycling containers

Recycling storage space is referred to as 'capacity', and is the shared recycling containers used by building residents to deposit their recyclables. The City of Sarnia makes use of 360-litre rollout, two-wheel carts for collection of recyclables in multi-residential buildings. Previous to this project, when a building required additional carts they were referred by the City to purchase them direct from the City's recycling collection contractor, Emterra Environmental (Emterra). The purchase price was $115.

How much recycling capacity is being provided?

Based on the provincial target of recycling 70% of all recyclables it is recommended that each residential unit be provided with a minimum of 50 litres of storage capacity. This is equivalent in size to a standard 14 gallon blue box. In terms of multi-residential containers, the following guidelines are recommended by CIF and are considered best practices:

- 360 litre carts – one cart for every 7 residential units
- Bulk bins - one cubic meter for every 15 residential units (i.e. a 4-yard bin for 60 units)

Continuous Improvement Funding was provided to Sarnia on the basis that this best practice ratio be implemented. The guidelines represent average requirements and it is assumed that at the building level there will be ranges depending on the demographics.

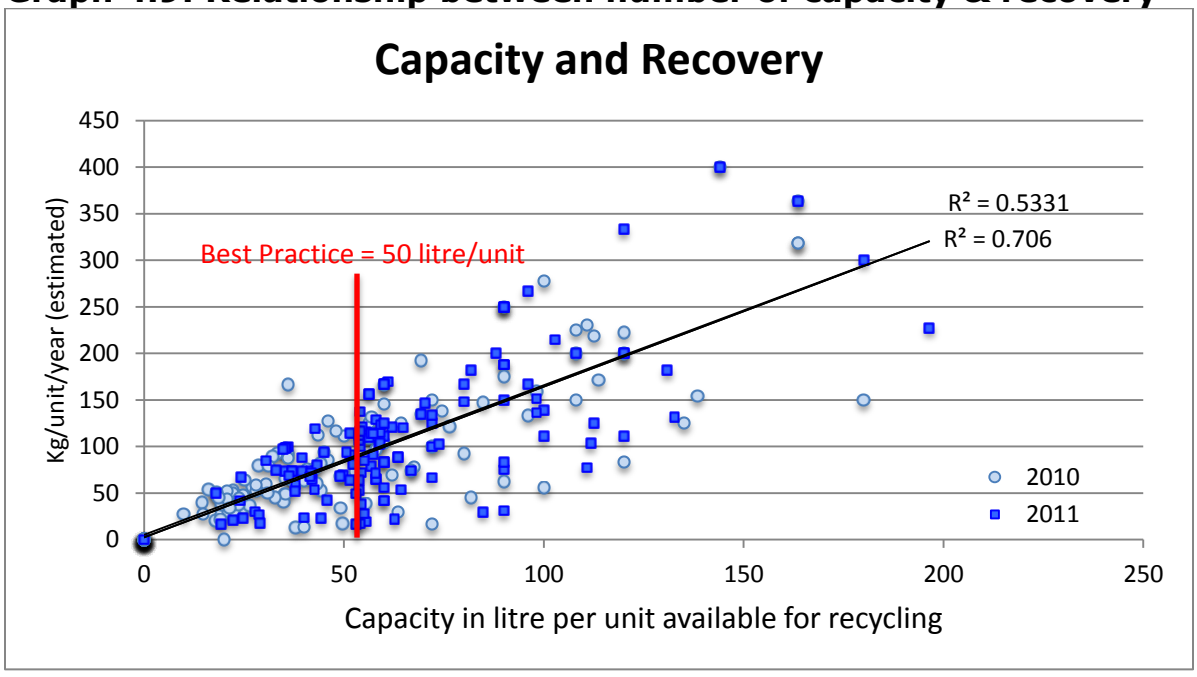
Table 4.8 provides details on cart capacity before and after project implementation. This includes summary information of the number of containers and litres capacity per unit determined during the site visits and comparative data after extra containers were put in place.

Table 4.8: Total number of recycling containers

	Baseline June 2010	Post implementation August 2011
360 litre carts	761	1,092
Residential units	8,072	8,072
Litres per unit	34	49
Units sharing one cart	10.6	7.4
Best Practices recommendation	50 litres per unit, 1 cart for every 7 units	

Buildings that provide more capacity for recycling will see an increase in recycling activity (up to an optimum level). This relationship is illustrated in Graph 4.11. The R value in the graph indicates the degree of correlation between the two variables, with a maximum of 1.0. Both before and after project implementation this correlation can be seen, after implementation the clustering of buildings at the Best Practices target of 50 litres per unit is evident. This relationship can be graphed before and after adding containers. When both sets of data are graphed together the comparison is easily seen, and it shows the co-relation more clearly.

Graph 4.9: Relationship between number of capacity & recovery



In some buildings getting to the Best Practices ratio of 50 litres per unit was a challenge because of lack of space to place the carts. This was especially the case for large buildings. This is shown in Table 4.9 below, which indicated that for larger than average buildings there is 44 litres of space per unit on average in the on-site recycling facilites, compared to the smaller than average buildings which have 80 litres capacity per unit on average.

Table 4.9: Recycling capacity and building size

Post-Implementation	Less than 50 units	50 units or more
Percent of all buildings	60%	40%
Capacity: litres per unit	80 litres per unit	44 litres per unit

For small buildings there was generally space to include carts and it was found that these buildings on average had well above the Best Practices ratio for capacity. Approximately 30% of buildings had less than 20 units and these buildings had on average 100 litres per unit capacity for recycling. This group also had a very high capture rate of approximately 80 kg/unit/year of collected recyclables. The summary data for the pre and post-implementation is presented in Table 4.10 below.

Table 4.10: Recycling capacity and recycling rate, baseline and post-implementation

Capacity	Baseline		Post-implementation	
	Percent of Buildings	Recycling rate Kg/unit	Percent of Buildings	Recycling rate Kg/unit
Low: less than 45 litres/unit	50%	54	23%	64
Best practice range: 45 to 55 litres/unit	10%	76	22%	76
High: more than 55 litres/unit	40%	159	55%	140

Other initiatives to increase recycling

Other elements designed to increase recycling rates in Sarnia's program include a phased-in approach to increased enforcement of Sarnia's waste by-law that prohibits recyclables in the garbage

- Phase 1: placement of signage at all buildings to inform residents and building management of the by-law and recycling program details, and
- Phase 2: after all signs are in place, increased enforcement with letters, fines, and rejecting garbage loads with recyclables.

Phase 4: Provide promotion & education materials

Print materials

A project goal was to distribute new print materials to promote recycling and educate building residents and staff about what can and cannot be recycled. Sarnia had access to print templates (resident flyers, posters and signs for buildings, container labels and a guidebook for superintendents, property managers and building owners) through the CIF website. The template materials were customized with Sarnia specific information.

Sarnia followed the procedure recommended by the *CIF Best Practice Guidelines* for distribution of print materials:

- Distribute print materials directly to residents,
- Distribute and displaying posters at multi-residential properties, and
- Apply labels to recycling containers.

These materials were not left with building staff for distribution. Municipal staff, including summer student staff were tasked with delivering materials.

Table 4.14 below provides details about the materials that were produced and distributed. Samples of P&E materials are in the Appendix.

Table 4.11: Summary of Promotion & Education materials

Promotion & Education component	Number distributed (approx.)	Method of distribution
Resident flyers	2010: 8.000 2011: 8,000 1 per residential unit	By municipal staff to each unit

Promotion & Education component	Number distributed (approx.)	Method of distribution
Posters	2010: 700 2011: 700 Multiples per building, depending on bldg size	Posted by municipal staff on each floor (chute room), laundry room, lobby, mail room, etc.
Signs	As of April 2013: 124 installed 57 to be installed 9 require replacements	Installed by Sign contractor
Containers labels	1,000 – 2 per cart (top and front)	By municipal/contract staff

Permanent signs for each building

A key promotion & education component of this project was the development of permanent, large signs to be installed in the recycling area at each building. Coreplast signs were used for indoor recycling stations, and aluminum signs were used for outdoor recycling stations. Site visits to each building determined the location and size of the signs, as well as how they would be installed. If there was no existing structure on which to post the signs, posts were installed for this purpose. The purposed of the signs was to:

- Produce an eye-catching, colourful recycling display panel
- Provide a permanent reminder to recycle
- Inform residents of program requirements (what to recycle, what not to recycle, how to prepare materials)
- Inform residents and building management of the City's by-law requirements

Due to recent contract changes, the City of Sarnia program has changed from a two-stream program to single stream.

Project budget and schedule

Table 5.1 below provides a summary of the project budget and actuals.

Table 5.1 Project budget, planned and actual

Description	Unit	Quantity (est.)	Unit Cost (est.)	CIF Approved (50% of cost)	Quantity (actual)	Unit Cost	Cost
Staff support	Building	175	$70	$6,125	175	$35	$6,125
Increase capacity	360 litre carts, labeled, delivered	490	$100	$24,500	510	$62	$15,810
Signs	One per building	175	$300	$26,250	124*	$300	$18,600
Total				**$56,875**			**$40,535**

* 124 installed, 57 to be installed, 9 require replacements

Concluding comments

As in many other municipalities, the multi-residential sector offered opportunities for increase recycling in the City of Sarnia. Because elements of the program had not been updated in many years, Sarnia took advantage of the Continuous Improvement Fund program for implementing best practices in this sector. Sarnia successfully completed the best practices that were required under this program. These included developing a database of all multi-residential properties in Sarnia and completing site visits at all properties to assess the challenge and opportunities at each building and to estimate recycling performance. Sarnia increased the average recycling capacity to the best practices level of 50 litres per unit by adding 500 carts to the program and developed new promotion & education material including large signage at each building. During the project, the sign contractor defaulted on sign install agreement and as a result, this aspect of the work was delayed. In 2013 Sarnia released a second RFP to complete the sign installation work.

Appendices

Appendix 1: Printed promotion & education materials

Sample of resident flyer and two-stream cart labels

Appendix 1: Sign design