Reducing Food Waste in Non-Residential Sectors

Driving Efficiencies Through Co-operative Collection of Food and Food Waste

Durham Region Pilot

Project Summary

December 2018

Recycling Council of Ontario

Pilot Lead

Walmart Foundation

Pilot Funder

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Executive Summary

Recycling Council of Ontario (RCO) set out to test the feasibility of creating a regional collection and consolidation co-operative for the non-residential / Industrial, Commercial, and Institutional (IC&I) sector to increase and encourage greater collection and diversion of source separated organics, edible food safe for consumption, and packaged foods needing depackaging by improving service efficiencies and costs. The objective was to mimic door-to-door service that municipalities provide to residents, and gather information about costs and tonnage. The pilot, funded by the Walmart Foundation and hosted by the Region of Durham, was guided by an advisory committee comprising interested and affected stakeholders, and included 16 generators that represented a variety of different businesses.

Observations

Over a four-month period between July–November 2018 13.5 tonnes of source separated organics was collected and composted; and 908 kg (2,008 lb.) of food was rescued and redistributed, which is equivalent to approximately 2,000 meals.

More than 50 per cent of generators typically produced between 50 – 150 kg (110 – 330 lb.) of organic waste per week despite the wide diversity of 'type' of generator (e.g., florist, golf course, day care).

Participating generators were keen to change their management approach, and were able to source separate materials successfully with minimal change in operations and staff effort.

Based on financial information provided by generators, diverting organics from the waste stream could result in reductions to disposal costs by as much as 60 per cent.

Despite the significant amounts of materials diverted to composting, participants would fall under the threshold of current IC&I regulations in Ontario (300 kg / 661 lb. weekly).

Contamination rates of participating generators' material were low with minimal education.

Identifying and recruiting participants required time and co-ordination but almost all approached were keen to participate.

The bulk of rescued food had a short shelf life and, therefore, needed to be consumed within 12 hours of being collected.

Generators expressed a willingness to pay more for a separate organics service if costs are reasonable.

Front-line staff of generators were generally cognizant and willing to support their organization's participation.

Local waste collection service provider was able to service a new route with minimal barriers.

Service distances did not warrant a separate consolidation site.

Local Business Improvement Area (BIA) proved to be an important and valuable partner to recruit pilot participants.

The pilot demonstrated that a concept of a regional collection and consolidation co-operative program for the non-residential / IC&I generators is feasible, and could address lack of scale and the often high costs for dedicated collection service. Sufficient financial and waste tonnage data was gathered to allow for commencement of a financial model that could be further tested in a second pilot.

Overview

Academic and industry studies identify root causes of food waste at various points along supply and value chains: agriculture, production, distribution, consumption, and end-of-life management. According to National Geographic "the energy that goes into the production, harvesting, transporting, and packaging of that wasted food generates more than 3.3 billion metric tons of carbon dioxide."[1]

A curbside waste audit in the Greater Toronto Area discovered that 40 per cent of the food waste that residents dispose is avoidable; approximately half (53 per cent) is leftovers that could have been eaten, with the remaining waste (47 per cent) is untouched food.[2] While the economic costs of food waste are staggering, we must also consider the environmental costs. When organic material is sent to landfill to decompose it releases methane into the atmosphere, which is a greenhouse gas 25 times more potent than carbon dioxide and is the single largest waste stream found in landfills.[3] Most importantly, the social aspect of food waste also ties into economic and environmental considerations, as the rate of food insecurity across Canada hovers at around 12 per cent, which means approximately 3.2 million Canadians do not have reliable access to adequate amounts of safe, good-quality, nutritious food.[4]

1 nationalgeographic.com/news/2015/1/150122-food-waste-climate-change-hunger/
2 foodpolicyforcanada.info.yorku.ca/goals/goal-5/food-waste/general-data/
3 Environment and Climate Change Canada: Technical Document on Municipal Solid Waste Organics Processing
4 Food Insecurity Policy Research (2014) Household Food Insecurity in Canada

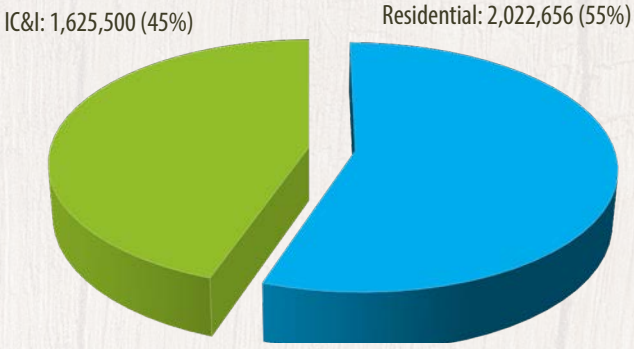
Circular Economy

Taking into consideration these three pillars – economic, environmental, social – there is significant opportunity to maintain the value of food and organic materials by applying circular economy principles. When composted, food waste can turn into a valuable nutrient in compost that can be utilized in farming practices. When broken down in an anaerobic digester, methane can be captured to produce renewable natural gas. When edible food is redirected to food rescue organizations for distribution it maintains its highest value and security is improved for those that need it most, such as social service agencies, meal programs, and community centres.

General acknowledgment that food waste comes with significant economic, environmental, and social failures has led to some preliminary work that examines opportunities within food supply chains: identify and correct inefficiencies in production, transportation, packaging, delivery, storage, and shelving. Conversely, there is limited study regarding end-of-life management of food and other compostable materials in non-residential sectors where there is significant opportunity.

Many Canadian municipalities have established comprehensive curbside organics programs, which leverages collection efficiencies from door-to-door services and in-home source separation built on continuous public education and outreach. However, the non-residential generators (e.g., retailers, stores, hospitals, food courts, etc.) generally have a different collection process whereby organic materials are managed independently by the generator on a facility-by-facility basis, which eliminates opportunity to leverage collection efficiencies or standardized services experienced by the residential sector.
This is the result of a lack of co-ordination by the generators and their independent service providers.

Food and Organic Waste Generated By Sector in Ontario by Tonnes



Source: Reports on Organic Waste Management in Ontario, prepared for the Ministry of Environment and Climate Change, 2015

Source separating food waste for dedicated collection and processing is also time consuming, costly, and logistically challenging. With relatively inexpensive disposal costs and no regulatory requirements, non-residential generators have poor organics diversion performance. Of the 1.6 million tonnes of food and organic waste generated by the IC&I sector annually, it is estimated that only 28 per cent of material is diverted. According to Statistics Canada, food waste is estimated at more than six million tonnes between retailers and consumer's plate, which is equivalent of 183 kg per person.

Value of Food Waste by Sector in Canada

Source: $27 billion revisited: The cost of Canada's annual food waste, VCM International, 2014

The social aspect of food waste also ties into economic and environmental considerations. The rate of food insecurity across Canada is around 12 per cent, which means approximately 3.2 million Canadians do not have reliable access to adequate amounts of safe, good-quality, nutritious food.[3]

Furthermore, the economic costs of food waste are also staggering, and estimated to be more than $49 billion in Canada annually.

3 cwp-csp.ca/resources/sites/default/files/resources/Household-Food-Insecurity-in-Canada-2014.pdf

Food and Food Waste in the IC&I Sector

Food and food waste disposal in the IC&I sector can be attributed to four perceived factors that are not mutually exclusive:

1. Cost premiums over disposal
2. Logistical constraints of on-site source separation
3. Access to end markets
4. Shortage of organics processing capacity

Despite an explicit desire to reduce the amount of food waste lost to disposal a majority of organizations have not changed their approach. The barriers, some real and some perceived, are reported to be costs, effort required for on-site management changes, space limitations, odours, and pest control. Although cost is cited most often as the largest barrier, many of the organizations that generate food waste are unaware of their current disposal costs, and what impact diverting organics has on overall waste management costs.

Most jurisdictions in Canada do not have regulations in place aimed specifically at the IC&I sector to require source separation or composting. This trend is changing with a number of North American jurisdictions – such as Massachusetts, Connecticut, California, and Nova Scotia – passing disposal bans or similar policy tools to reduce food waste. The drive behind these regulations are consistent: reduce greenhouse gas (GHG) emissions and make better use of resources, including surplus food and food waste.

The Deer Creek Golf and Banquet Facility in Ajax, ON made green bin collection simple and efficient for the pilot.

Pilot Collaboration

The pilot was based on partnerships between non-residential generators of surplus food and food waste and their waste/ recycling service providers, as well as local food rescue organizations, to co-ordinate collection, transport, and consolidation of edible food for redistribution and organic waste for composting. The objective was to consider if a co-ordinated approach could decrease costs of collection, transport, processing, and distribution as members of a pre-competitive co-operative increased. Furthermore, if proven successful in cost reduction and diversion increase, the co-operative model could be scaled and replicated in communities across Canada.

An Advisory Committee (AC) included members of a variety of interested and affected stakeholders, including property management companies, food rescue hubs, waste management companies, local sustainable business groups, the local Business Improvement Area (BIA), and representatives from local and regional governments. Participation was voluntary. Each member contributed a unique perspective on how to execute on the pilot's objectives successfully over its duration, and offered strategic advice on how to handle certain aspects of the pilot as they arose, including identifying generators to participate, and providing key information critical to the pilot summary. To support the pilot, AC members agreed to attend and fully participate in meetings; provide feedback on aspects of pilot implementation and reporting; and serve as ambassadors for the pilot.

Advisory Committee Members

EcoBusiness Network, previously operating under the title Durham Sustain Ability (DSA), has a rich, decades long history as the catalyst leading environmental sustainability efforts in Durham. In its beginning stages, DSA was focused exclusively on driving environmental improvements at the resident and community level by providing consulting, project leadership, and education programs.

Company representative: Christine Ball

Feed the Need in Durham is the regional food distribution warehouse serving Durham Region. We provide food to emergency food providers such as food banks, soup kitchens, community service centres, shelters, drop-in centres, breakfast feeding programs, etc. To accomplish this we operate a 10,000^2 ft. warehouse located at Marwood Drive in Oshawa.

Company representative: Ben Earle

Ivanhoé Cambridge develops and invests in high-quality real estate properties, projects and companies that are shaping the urban fabric in dynamic cities around the world. It does so responsibly, with a long-term view to generate optimal, risk-adjusted returns. Ivanhoé Cambridge is committed to creating living spaces that foster the well-being of people and communities, while reducing its environmental footprint.

Company representative: Sera Kontarini

Miller Waste Systems Inc. has been in operation since 1961. Miller is a leader in waste management, providing governments and industries with a wide range of services in the provinces of Ontario, Nova Scotia, New Brunswick and Manitoba. Miller has over 50 years' experience in the waste management sector and operates out of 30 locations.

Company representative: Denis Goulet

Durham Region is east of Toronto, in the Golden Horseshoe area of Ontario. It is a mix of rural, residential, and commercial land. North Durham is mostly rural, with a thriving agriculture sector, and is home to Oak Ridges Moraine. To the south, lakeshore communities offer urban development and a diverse employment base.

Company representative: Peter Veiga

Second Harvest is the largest food rescue organization in Canada and global thought leader on food recovery. We work across the supply chain from farmer to retail to capture surplus food before it ends up in the landfill which negatively impacts our environment.

Company representative: Lori Nikkel

StormFisher owns and operates a 2.85 MW biogas facility in London, Ontario that converts up to 100,000 tonnes of organic waste each year into renewable energy and organic-based fertilizer. We provide disposal services to Ontario's food processors, food retailers, waste haulers, and any business where food is either prepared or consumed. In addition StormFisher has been involved in the development of numerous other facilities in the U.S. and Canada.

Company representative: Chris Guillon

Since 1887, Walker Industries has proven to be a dynamic and diversified company. Our group of companies include aggregates, construction, emulsions, environmental project management, waste management, renewable energy projects and green building. Walker Industries has a strong reputation for integrity and advanced solutions. We are a company dedicated to the environment, community and safety of our employees.

Company representative: Tim Murphy

The BIA provides a significant contribution to the downtown by acting as an advocate for its members and by promoting new programs and changes that will assist the members. This ranges from who to contact about an issue in the downtown, working with the City on their initiatives - such as pilot projects to improve the streetscape. The commitment to its members, the City and the residents of Oshawa will ensure that downtown continues to be active, safe and a destination of choice.

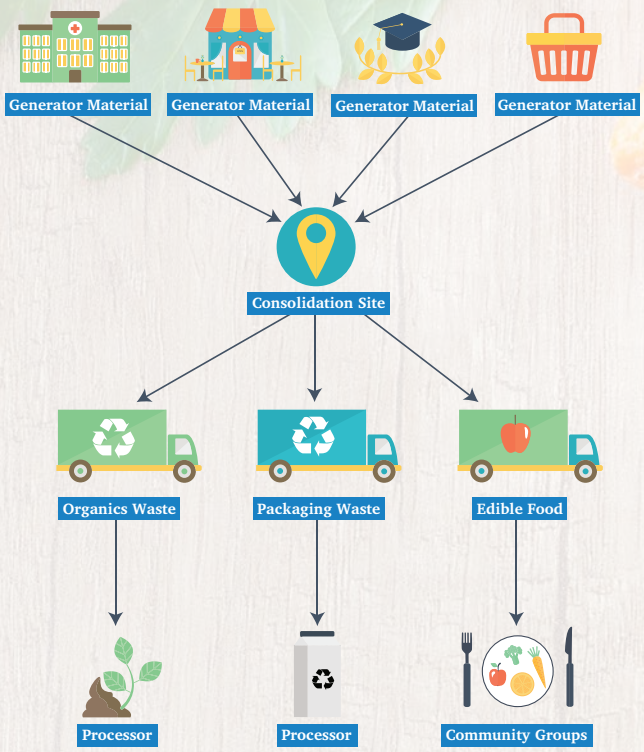
Company representative: Garth Johns

Although not formally part of the AC representatives from the City of Oshawa also made important contributions to the design and implementation of this pilot.

Recycling Council of Ontario representatives: Jo-Anne St. Godard, Executive Director; Daniel Bida, Project Manager

Co-Operative Collection and Consolidation

The pilot was initially based on co-operative model that connected unrelated IC&I generators in a specific region to test the viability of a shared collection and consolidation system, using a centrally located site. The goal was to improve efficiencies and build scale in order to reduce economic and environmental costs.



Objectives:

1. Lever the successful collection model refined by the municipal sector by facilitating collection through a regional approach, to minimize driving distances between pick-up points and building economies of scale to increase food and food waste recovery rates while decreasing transport costs.

2. Create an accessible consolidation centre that can service three food streams that include edible/donated food, source separated organics, and non-consumable food requiring depackaging.

3. Collect relevant data to measure any economic, social, and environmental gains, and market response that includes:

    a. Amount of edible food that is collected and made available to food rescue organizations

    b. Amount of source separated organics that is successfully collected and composted

    c. Amount of packaging collected and recycled

    d. Tonnes of GHG emissions reduced through the above activities

RCO collaborated with the Region of Durham (host municipal government), the Oshawa BIA (association), and Miller Waste (collection service provider and organics processor) to identify generators in a regional service area. RCO visited a variety of potential generators within an identified catchment area to recruit pilot participants. The criteria for participation was limited to businesses and institutions within identified service areas, with neither size nor type precluding participation.

It is important to note that collection service and on-site receptacles with bags were provided to participants free of charge for the duration of the pilot. Participants' responsibilities included agreeing to source separate organic materials from disposal, and storing edible food for recovery for the duration of the pilot.

Participants were surveyed at several points throughout the four-month pilot with various quantitative questions on cost, time commitment, and service, as well as qualitative questions on how they felt about the pilot and whether they received feedback from staff, customers, or clients.

There were 19 collection sites in total who represented the wide variety of generator types typical of the IC&I sector.

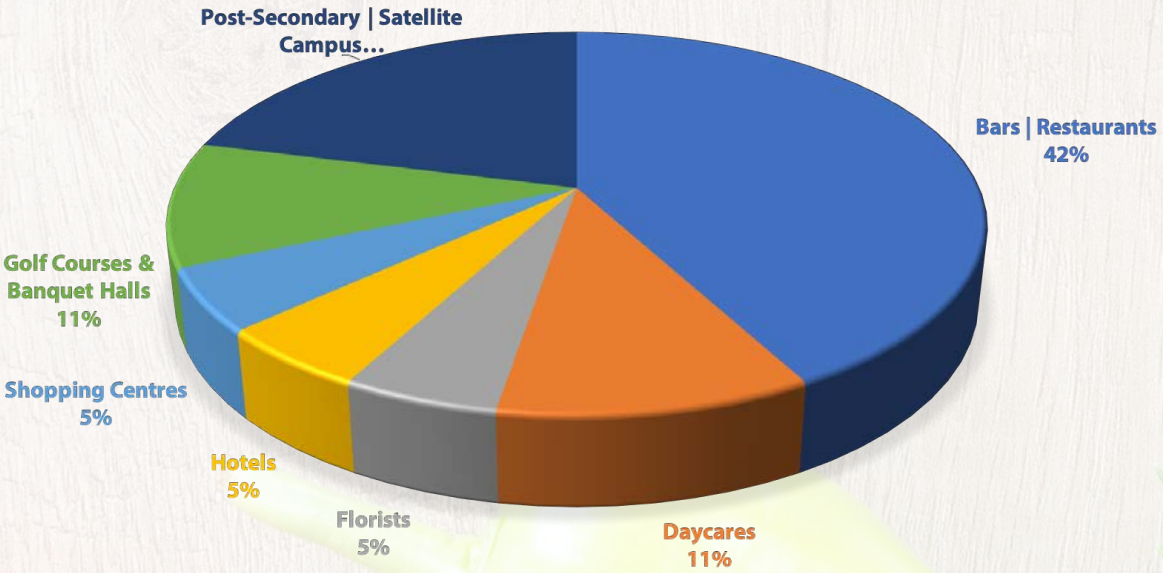
Map 1: Downtown Oshawa Territory and Generators Serviced by the City of Oshawa

- Berry Hill Food Company
- Classic Flowers
- Eggscellent Eatery
- General Pub and Grill
- Kenzo Ramen
- Magic Pencils Learning Centre
- Oz Pita Wraps
- Spicy Affairs
- Subway Restaurant

Map 2: Region of Durham Territory and Generators Serviced by Miller Waste

- Campus Childcare Centre
- Deer Creek Golf and Banquet Facility
- Holiday Inn Express and Suites Oshawa Downtown
- Ontario Tech University: 61 Charles St.
- Ontario Tech University: Bordessa Hall
- Ontario Tech University: Faculty of Education
- St. Louis Bar and Grill
- Trent University Durham GTA

Graph 1: Participating Generators by Type

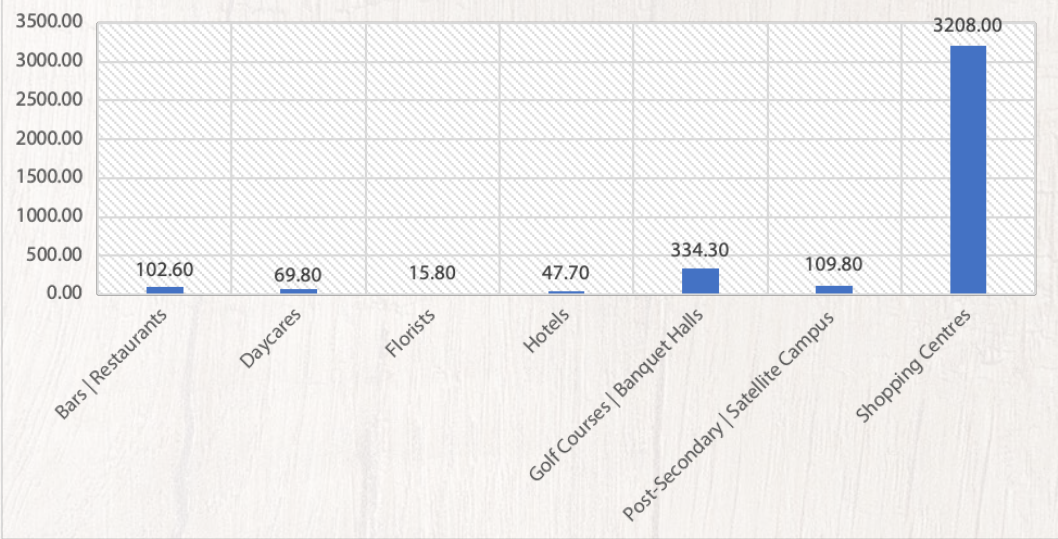


Generators' Experience

All generators were surveyed prior to launch to gather basic baseline information of their current organic and food waste management, which included:

- Three were previously separating organics from waste.
- Two were previously diverting edible food for rescue.
- Sixty per cent received waste management collection service through their membership in the Oshawa BIA, and did not receive separate invoices for waste management services.
- All generators indicated they would be open to donating leftovers and surplus food with some assistance/facilitation (i.e., they did not feel they had the time to organize and make deliveries).

Graph 2: Generators' Weekly Tonnage in Kilograms



Consolidation Site

The intention at the outset was to use a centrally located site that was conveniently located and accessible for all stakeholders with six functions:

1. Receive food and food waste of any size or quantity in three separate streams.
2. Store edible food to keep it separate, safe, and consumable until pick-up.
3. Provide staging areas for depackaging of expired or other unusable/inedible food.
4. Provide space for materials in a manner that allows for preprocessing or sorting to improve quality assurance.
5. Provide convenient pick-up location for each of the service providers that are taking materials from the site, including food recovery organizations, organic processors, and packaging recyclers.
6. Reduce overall costs for users.

The centrally located consolidation site, accessible to generators, waste management companies and food rescue agencies would allow the co-operative to manage edible/donated food, source-separate organics and non-consumable food requiring depackaging.

The pilot sought to include, at minimum, one grocery retailer, as it often requires depackaging services. However, none approached were willing to participate. Consequently, the decision was made to forego and not test depackaging equipment or the expanded process in this pilot. Furthermore, for this pilot, the need for a common collection/ consolidation site was fulfilled by Miller Waste, which already had two transfer stations and one composting facility operating in Durham Region that could act as the consolidation site.

Edible Food Rescue

One of the key targeted streams was edible food. The original terms of the pilot contemplated the possibility of collecting two streams of edible foods: perishables and non-perishables at the consolidation site, and staging them for pick-up by food rescue agencies.

Feed the Need in Durham served as the pilot food rescue partner, and is the regional food distribution warehouse that serves Durham Region. It provides rescued food to soup kitchens, community service centres, shelters, drop-in centres, and breakfast feeding programs out of its 930 m^2 warehouse in Oshawa.

Reusable containers were used to store edible food at the Oshawa Centre. Feed the Need in Durham would pick up the food twice weekly and drop them off at Refuge Youth Outreach Centre or the Back Door Mission in Oshawa.

In addition to the non-perishable foods it also handles large volumes of perishable foods, and between 60,000 – 70,000 kilograms (132,000 – 154,000 lb.) of food per month that is distributed to an estimated 50,000 people per year.

During the pilot it was discovered that the majority of edible food collected from generators needed to be consumed within a day of collection. With Feed the Need in Durham's established transport and logistical model, the recovered food went directly from the generator to a social meal program and resulted in new partnerships.

The pilot also distributed reusable containers to participating locations who were willing to store the material in their refrigerators overnight, and then arranged for pick-up the following day by a local food rescue organization. In nine weeks a total of 908 kg (2,008 lb.) of food was rescued and donated, which is the approximate equivalent of 2,000 meals.

In addition to the food itself rescued from disposal other unanticipated benefits were discovered: volunteers appreciated that they could reduce meal preparative as approximately 23 kg (50 lb.) of food received was ready to eat, which allowed them to shift their attention to other tasks.

The Oshawa Centre and Feed the Need in Durham have expressed their intention to continue with the arrangement post-pilot and expand it to other food service operations on the property.

Regulatory Context

Source Separated Organic Waste

Jurisdictions in North America and Europe are recognizing the importance of reducing food waste and introducing regulations to reduce organics waste lost to disposal. Numerous states and provinces have already put in place landfill organics bans. Many cities are also actively introducing food waste policies, including Vancouver, San Francisco, and Calgary.

Food Rescue

Every province and territory in Canada has passed some form of law that allows for the donation of surplus food while protecting the donor, either individual or corporate, from legal liability. Donors are generally protected from liability as long as they know that the material being donated is safe to eat and not waste.

Table 1: Food Donor Laws in Canada

Province / Territory	Act
Alberta	*Charitable Donation of Food Act*, RSA 2000, c C-8
British Columbia	*Food Donor Encouragement Act*, SBC 1997, c 8
Manitoba	*The Food Donations Act*, CCSM c F135
New Brunswick	*Charitable Donation of Food Act*, RSNB 2011, c 124
Newfoundland and Labrador	*Donation of Food Act*, SNL 1997, cD-26.1
Northwest Territories	*Donation of Food Act*, SNWT 2008, c 14
Nova Scotia	*Volunteer Services Act*, RSNS 1989, c 497
Nunavut	*Donation of Food Act*, SNu 2013, c 8
Ontario	*Donation of Food Act*, 1994, SO 1994, c 19
Prince Edward Island	*Donation of Food Act*, RSPEI 1988, c D-13.1
Quebec	Civil Code of Quebec, CQLR c CCQ-1991 Art.1471
Saskatchewan	*Donation of Food Act*, 1995, The SS 1995, c D-32.01
Yukon	*Donation of Food Act*, SY 2012, c 11

IC&I Approach to Waste Management

Most IC&I generators in Canada send organics to disposal. Collection services are either provided location by location, charged by service visits or tonnage generated, or a combination of the two.

Pilot participants were surveyed for details of their disposal and organics services, and costs associated where they existed prior to the pilot. Costs provided were normally tied to minimum service levels. For instance, a minimum number of totes (2-3) and minimum number of pick-ups (at least once per week). The costs per bin varied and reported to range from $15-20 per 32-gallon tote.

The small tote provided to the University of Ontario Institute of Technology in Oshawa, ON.

In contrast, for generators that did not receive organics service prior and put the material in the garbage, costs were substantially lower: $10 per pick-up for a 3-yard bin and $33 per pick-up for a 6-yard bin, or the equivalent of $0.53-0.87 per 121 litre (32 gallon) tote.

When services are provided on a location by location basis, there is a lack of co-ordination between neighbouring pick-up points, which negates opportunity to share services and reduce costs. In addition, as charges are commonly based on service frequencies rather than actual tonnage, there is an inherent disincentive to reduce the amount that goes into each bin.

An objective of the pilot was to test the opportunity to mimic the residential sector by creating geographically linked clusters of generators and create collective buying membership hubs to build service efficiencies while reducing costs.

Co-operative Collection and Membership Concept

This pilot attempted to gather information and test regional consolidation service made up of clustered IC&I generators, and implement a regionally based and financed co-operative where membership is a flat rate charged by size or type and user fee determined by weight of food or organic materials collected. Fees would be revisited and potentially reduced as membership and usage increased. Members would effectively form a buying organization; tender out services as a group; and maintain a competitive process to procure collection, transport, and processing services.

To facilitate increasing amounts of food rescue, the co-operative connects local food recovery and rescue organizations, membership, and service providers.

Benefits

1. Reduced waste management costs and annual membership fees as the membership grows.
    - Diverting organics from disposal could reduce the total weight of garbage bins by as much as 65 per cent, meaning fewer bins and less frequent pick-ups required.
    - Costs of running the co-operative are fixed, therefore, increased membership will amortize costs among a greater number of users, reducing costs for all.
    - More members will result in increased total tonnage and improved route density, which increases service efficiencies.
2. Increased transparency on final disposition of materials.
    - The service buying consortium could add specific requirements for verification.

Based on quotes received from participants and waste management companies, Table 2 demonstrates the cost differences for a potential member of the co-operative once it surpasses 30 tonnes per week of collections.

Table 2: Post-Secondary Institution Generating 110 kg (243 lb.) Weekly Organics

Annual costs	No organics service	With organics service	With organics service in a co-op
Garbage service	$1,716	$572	$572
Organics service	-	$4,420	$3,879
Total	$1,716	$4,992	$4,451
Savings with Collective			($541)

Consolidation and Depackaging Site

The pilot provided sufficient evidence to demonstrate that a consolidation site could benefit participants, similar to how existing transfer stations add value to the waste management value chain, through the consolidation of materials into larger trucks. Although not tested in this pilot, a consolidation site could also serve as a collection and re-distribution point for edible food, particularly for those that do not have a hub.

Miller Waste processed all the collected organic material at its facility in Oshawa, ON.

This pilot did not initiate an independent consolidation site as initially intended because the use of an existing transfer station was made available by Miller Waste. It is important to note that most jurisdictions will require some type of permit for any facility to receive or store organic materials. Future studies or pilots will need to examine the feasibility of providing such permits and absorbing associated costs.

Bodies that grant the permits will need to balance infrastructure requirements to divert more organics, costs, and ensure protection of human and environmental health. Efforts, costs, and liabilities associated with a regionalized consolidation facility are crucial data points for future pilots that establish a co-operative model for food waste reduction.

Depackaging

The prospect of managing three streams of food and food waste at a single location, including packaged goods requiring depackaging, was part of the innovation of this pilot. This would increase the amount and value of both the packaging and food waste streams, by reducing processing fees at final disposition. Unfortunately, as there were no generators that produced packaged organic waste the pilot did not test the feasibility of combining packaged organics with the other streams.

Example of material requiring depackaging from a grocery store: organic material from its plastic packaging

During the pilot, however, information was gathered to inform the costs of financing depackaging machinery and the amount of tonnage that would be required to make it economically feasible. Identifying and including generators that have organics needing depackaging will be an important objective of any future pilots.

IC&I generators are not typically charged based on the weight of organics they generate for composting; rather, they are charged based on the number of totes they have and how full they are. The pilot discovered that most totes are not at capacity at pick-up, and as a result, generators typically pay more for service than they would if they were charged strictly for tonnage.

Based on the lowest quote received from the waste management companies surveyed, the cost for a tote exchange organics service was $17 per bin per pick-up, which, assuming the tote is at capacity, is equivalent to $0.40 per kg. However, waste companies do not charge by weight, and most bins were at less than capacity from week to week. Charging by weight would be more accurate and likely more cost effective for a generator, however, not many service providers are equipped with scales to weigh each load at the point of pick up the service is charged by tote.

On a larger scale where it is not feasible to use more than 80 totes per week, the economics differ. The cost difference between weight versus totes is significant. The economics of the waste industry generally favour larger generators because they make it more efficient to collect and process the same volume of material as a series of small generators would produce.

Miller Waste prepares to pick up organic waste outside a University of Ontario satellite campus.

Table 3: Potential Annual Operating Costs of the Co-Operative

Administration (primarily bookkeeping and tax filings)	$12,000
General Manager (incl. member recruitment, procurement, etc.)	$60,000
Communications/Marketing (incl. brochures and website)	$3,000
General overhead	$7,500
Reusable containers and cooler bags for donations	$4,140
Total	**$86,640**

Table 4: Other Meaningful Inputs

Weight of full 32-Gallon tote	42.5 kg
Weekly organics production per Small co-op member	72.1 kg (2 totes)
Weekly organics production per Medium co-op member	110 kg (4-5 totes)
Weekly organics production per Large co-op member	335 kg (8 totes)
Weekly organics production per Extra Large co-op member	1,000 kg (24 totes)
Tipping fee at processing facility (compost)	$150 per tonne
Garbage service cost	$33 per 6-yard bin

Potential Savings

Outside of the savings created from reduced garbage service requirements, there are two primary areas where savings are possible:

1. Disposal fees

During the pilot contamination levels of the material collected from generators was low: visually tested at 5 per cent or less. Comparatively, the contamination rate for municipal residential programs could be as high as 20%, depending on the breadth of material allowed in the green bin and whether compostable bags are mandated for use. Research indicates that completely uncontaminated organic material may be able to pay a tipping fee as low as $65 per tonne at a composting facility and $45 per tonne at a biogas plant. Considering the low contamination levels of the material, it is reasonable to conclude that the waste management sector could collect organic material for $85-100 per tonne, which would result in savings of $50-65 per tonne.

A waste transport vehicle unloads organic waste from the food waste pilot at the composting facility.

Working backwards to the per tote pick-up cost, this change could result in savings of $2.12-2.76 per tote ($0.05-0.065 per kg).

These assumptions, however, exclude transportation cost differences to compost or anaerobic digestion processing facilities. The benchmark of this pilot was the composting facility located in Pickering, ON and the rate is based on residential curbside organics that may have higher contamination rates. It should be noted that it is increasingly difficult to process organics with anaerobic digestion, as the current capacity has been reached, overall costs may be higher until more facilities are developed.

2. Labour and transport costs

The pricing given by the waste management sector assumes that each IC&I generator is not located near another IC&I generator (or they both are not serviced by the same company). A co-operative can work to create geographic clusters based on location of its members, which creates efficiencies that all companies would endeavour to create on their own. Regardless, pricing improves with more material - and improved route density impacts labour and transport costs.

At the outset a newly formed co-operative may not produce enough volume to help the waste service provider reduce or maintain costs. However, it would represent a meaningful opportunity to acquire a cluster of new customers that may offer meaningful efficiencies when it comes to transport.

Based on the assumptions of membership growth, there may be two fee categories changing as presented.

Table 5: Potential Fee Categories Over Four Years

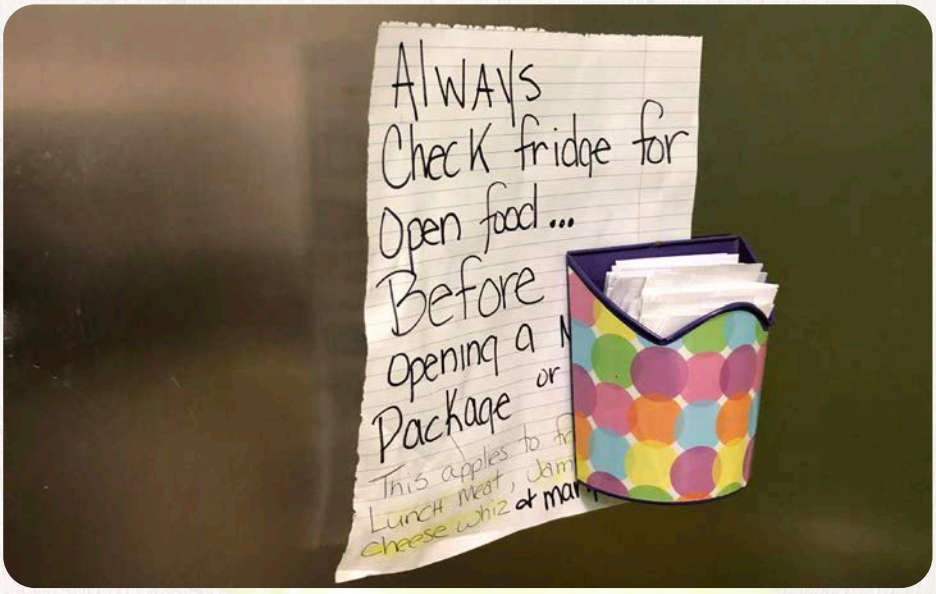
	Pilot	Year 2	Year 3	Year 4
Members	16	61	102	203
Member organics kgs per week	1,151	9,163	15,605	30,210
Member fee per kg	$1.57	$0.20	$0.11	$0.06
Disposal cost per tonne	$150	$150	$100	$85
Cost savings from route efficiencies	N/A	N/A	5%	10%
Projected organics service cost per tote per pick-up	$17-20	$17.00	$14.56	$13.60
Projected organics service per kg	$0.40-0.47	$0.40	$0.34	$0.32
Total cost per kg	$1.97-2.04	$0.60	$0.45	$0.38
Total cost per full tote	$83.73-86.70	$25.50	$19.13	$16.15
Monthly cost at 3 totes per week	$1,004.76-1,040.40	$306	$229.56	$ 193.80

Other Observations

After paying for co-operative operating expenses there are no savings for members until total tonnage exceeds 30 tonnes per week.

To make the initiative worthwhile the co-operative will need to be aggressive in expanding membership quickly.

The co-operative will need to make the contract attractive to the service provider(s) and rely on competitive forces to reduce costs. Assuming a $/t gross profit margin was the same regardless of reductions to tipping fees; if instead assumed that a constant gross margin percentage, the savings to co-operative are quickly realized. Taken one step further and assuming that in a competitive situation the various waste management companies may sacrifice a portion of their profits to win a contract, the savings to co-operative members accrue even faster.



The participating daycare was diligent in ensuring that meal planning was optimized.

Conclusion

Reducing Food Waste in Non-Residential Sectors: Driving Efficiencies Through Co-operative Collection of Food and Food Waste provides a series of learnings as it pertains to collecting and consolidating food and food waste from the IC&I sector, including available tonnage, disposal, and organics collection costs and on-site management.

A follow-up pilot would be of value to learn about collecting from larger sampling and broader variety of generators to include grocery stores, distribution centres, and food processing facilities that includes a consolidation site that offers depackaging.

Collecting and Consolidating Food Waste

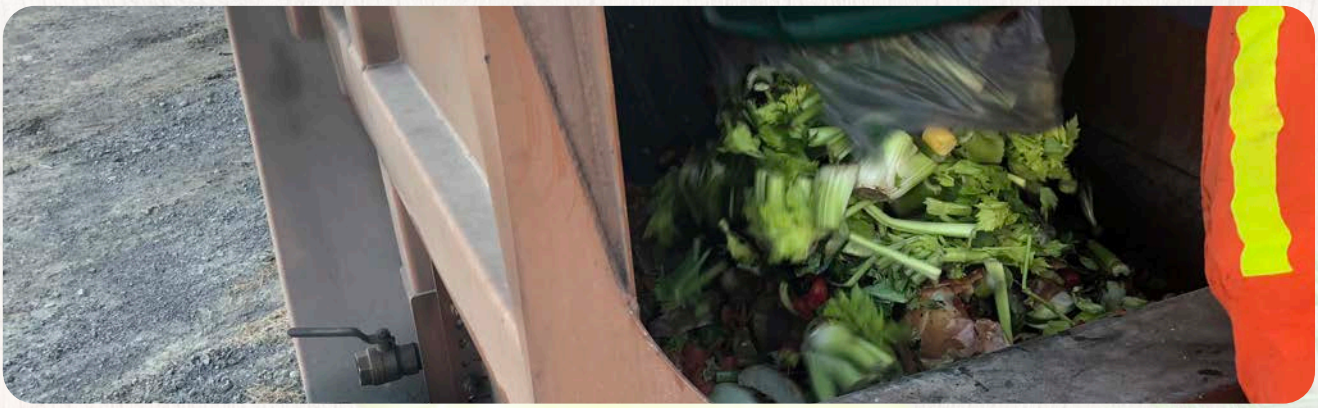
Primary benefits of a co-operative:

- Economic: Reduced garbage costs, as approximately 1/3 of the volume and 2/3 of the weight would come out of this stream with organics management. This will result in savings of up to 60 per cent of current disposal costs. Although total waste management costs will increase relative to not diverting organics, the added increase will be less for co-operative members.
- Environmental: 13.5 tonnes of organics was diverted from landfill during the pilot, which equates to emission reductions of approximately 18.8 tonnes of CO2e.
- Social (Educational): Staff at participating locations were pleased to take part in an environmental initiative as most were aware that organics can be diverted from disposal. In some cases, customers were pleased to see diversion taking place; Holiday Inn received feedback from numerous guests on comment cards, in response to a general 'any other comments' question.

Based on discussions with participants at pilot conclusion there is some willingness to pay more for a separate organics service, but added cost must be reasonable: $100-150 increase per month is too much, but $20-40 would be feasible.

There was not much issue with on-site source separation and the learning was quick for all generators. In general, the level of effort to change was low and adoption was quick.

Most of the material collected from pilot participants was practically free of contaminants.



Throughout the duration of the pilot the material collected was free of contaminants

Even though the pilot offered free organics pick-up and processing to participants, there was some level of resistance to participating:

- Amount of bins on-site and where to store them.
- Increased pests and odours (paradoxically, participating generators that began separating reported reduced pests and odours).
- Potential impact on staff/operations, and not wanting to train for a four-month pilot.
- Franchised or corporate-run locations were hesitant because of the need to get approval from the head office to participate. This additional task resulted in them declining to participate.
- Most small- and medium-sized enterprises do not produce enough material to justify the 3-tote minimum often required by service providers. Nineteen per cent of pilot participants produced enough material to justify this number of totes. The rest only need 1 or 2 totes per week.
- All of pilot participants produced less on organic waste average than the proposed 300 kg/week threshold in Ontario's proposed regulations.

Food Rescue

A significant impact can be made with a focus on perishable foods, which is currently an underserved part of the food rescue sector.

The perishable nature of the food being rescued means that it needs to become a meal within 48 hours of being made. Food banks cannot and do not handle that type of donation and it only makes up a portion of the many service agencies feeding those in need.

The Oshawa Centre Mall tracked the amount of food rescued and redistributed to service agencies throughout the pilot.

A co-operative can play a valuable role in facilitating connections between donors and food rescue organizations to ensure the cold chain is maintained and the food gets where it needs to be in a timely manner.

Missions, soup kitchens, and other service agencies that serve food are subject to the same food safety rules as restaurants.

Continuation

Given that RCO and the Region of Durham were unable to fund organic waste management costs on behalf of IC&I generators, a model was sought to continue source separation and collection while the co-operative model was refined and a non-profit collective could be established.

However, most of the generators were small restaurants that do not produce enough organic waste to meet the minimum service levels required by the service providers. One company surveyed declined interest in continuing and others stated they would only do a three-bin minimum; the restaurant generators in the pilot generated 1-2 bins.

In addition, 50 per cent of the participants are part of the Downtown Oshawa BIA, which receives service from the City of Oshawa that is funded through residential property taxes. This means that an invoice from a waste management company would be a new cost altogether, and likely creates greater resistance to pay additionally for separate organics collection and processing.

All participants have been made aware of the possible incoming regulations in Ontario, as well as the benefits of diverting organics away from landfill. All participants understand the impacts of separating organics on operations, and there were no complaints that it got in the way or was a problem.

The costs quoted ranged from $15-20 per bin per pick up. One of the primary benefits that participants can be offered, therefore, is that they may be able to avoid the three-bin minimum as a result of bulk orders. Most of them only need one or two bins, which equates to a difference of at least $60 per month.

The intention is to continue the system developed through this pilot with an aim to make it a permanent service. This will require a dedicated person to recruit additional members.

Recommendations

The IC&I sector contains a broad spectrum of generators that vary in size. Large generators that are likely receiving organics service is because of their ability to produce a significant volume of material free of any contaminants, at one location, and offer sufficient scale that makes collection and processing economically feasible. However, the vast majority of IC&I generators in the pilot were small- and medium-sized enterprises that fall below the minimum volume required by service providers to pick-up organics. Each alone does not offer sufficient scale to make organics service economically feasible, and unless it is mandated by government or offered by the municipality to a BIA it does not happen. This pilot focused on unlocking a large portion of the IC&I sector that is underserviced, and offer opportunities for community-scale consolidation in order to make the economics feasible for generators and service providers.

Food rescue opportunities also exist in a similar fashion: large donors and food rescue hubs already work together when and, where possible, with non-perishable foods. Small- and medium-sized enterprises have surplus food to donate, as well as perishable foods, but each alone does not produce enough to justify a single trip for food rescue organizations. Facilitating greater food rescue opportunities of perishable foods in the IC&I sector requires co-operation and shared resources among generators, rescuers, and service agencies. Specifically, using on-site refrigeration and washing stations, re-usable containers that are passed between donors and recipients, and existing cars and vans to transport the food in a timely manner. Approximately 23-45 kg (50-100 lb) per day of surplus food could be made available for donation from local shopping centres alone. Combining these natural consolidation points with tools like foodrescue.ca will redirect a meaningful and impactful amount of food in communities across Canada.

Further testing is required to fully form the business model and understand the related challenges

1. Rescuing food where a Food Rescue Hub doesn't already exist.
2. Running a consolidation site where sufficient transfer station capacity does not exist.
3. Depackaging material primarily from the grocery sector that needs pre-processing before it can be composted or anaerobically digested.

A systemic level shift will have to occur for generators and waste service providers in order to stop food and food waste lost to disposal. Whenever a shift of this nature occurs, the entrenched interests resist change. Approaching this challenge as a non-profit facilitator that represents the needs of its members offers all stakeholders transparency.

Scale is also important, and ultimately, every co-operative will need to manage a minimum amount of organic waste per week to be viable and offer sufficient benefit.

About Recycling Council of Ontario

Established in 1978, Recycling Council of Ontario is a not-for-profit environmental charity whose mandate is the elimination of waste, with multi-stakeholder membership that includes governments, business and industry, consumers and public, collectors, recyclers, academics, and researchers. RCO's work falls into three main pillars: behaviour change through education and programs; advocacy and policy development; research and pilot projects.

Recycling Council of Ontario

RCO has facilitated public and private partnerships to accelerate outcomes anchored in circular economy principles through resource efficiency and waste reduction. RCO's proven success is embodied and most recognized in Ontario's Blue Box Program, which is available to 97 percent of households and keeps 66 per cent of residential printed paper and packaging from landfills. RCO played a key role its creation and brought together public and private interests to establish collective environment and economic objectives. For this effort RCO was the recipient of the United Nations Environmental Protection Award in 1989.

RCO also prides itself as an agent of positive change by identifying opportunities and rallying partnerships to trial innovative solutions that cause long-lasting behaviour change. Our forward-facing pilot projects challenge conventional thinking, and merges innovation with practicality. RCO pilots, like the Blue Box Program, are the foundation for many of Ontario's most sustainable and results-based programs.

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