

# Issue Paper #2

## Commercial, Industrial, Institutional and Multifamily Recycling

---

### 2.1 Overview

As part of the planning effort to update the Broome County Local Solid Waste Management Plan, a Continuous Improvement Workshop was held in July of 2008. An outcome of the workshop included identifying upstream diversion strategies including fostering additional commercial and multifamily recycling through more comprehensive programs. This issue paper aims to address commercial and multifamily recycling challenges and offer recommendations for the County to consider as a means to improve waste diversion from this sector.

Recycling collection programs at commercial and industrial sites, institutional facilities (i.e., schools, universities, hospitals, prisons, etc.) and multifamily buildings<sup>1</sup> present issues that are unique compared to residential recycling collection from single-family homes. This issue paper will discuss:

- Common recycling challenges for the multifamily and commercial/industrial/institutional (CII) sectors and provide recommendations to overcome these challenges;
- Implementation requirements to improve CII and multifamily recycling programs;
- Capital and operating expenses related to improving CII and multifamily recycling programs;
- Diversion potential;
- Stakeholder concerns; and
- Benefits and drawbacks of implementing an advanced CII and multifamily recycling program.

### 2.2 Common Recycling Challenges

Some recycling challenges are universal while others differ between the multifamily and CII sectors. For that reason, some of the discussions are listed separately below.

---

<sup>1</sup> In most municipalities, larger multifamily buildings (usually 5 units or more) are considered commercial accounts and their garbage and recyclable materials are collected separately from residential routes consisting of single-family homes. For this paper, large multifamily dwelling units are the focus.

### 2.2.1 Site Issues

Oftentimes businesses and multifamily buildings have limited storage space for recycling containers. Any extra outdoor space is usually reserved for employee, customer, or tenant parking.

Some cities and counties have passed ordinances that require adequate outside space be designated for the placement of recycling collection containers when a new CII establishment or multifamily housing developer applies for a building permit. (This is often required in building plans for garbage dumpsters, however space for recycling containers is frequently overlooked.). The benefit to these types of ordinances isn't immediate, but in the long-run the local government would eliminate or at least reduce this barrier to recycling. Many municipalities adopt minimum requirements for space for recycling containers at all new developments. Examples of guidelines are provided in Appendix A.

#### 2.2.1.1 Commercial/Industrial/Institutional Locations

In addition to dumpsters, which are usually used for the collection of old corrugated cardboard (OCC) at CII sites, most haulers offer wheeled carts to be used for the collection of other recyclable materials such as paper, plastic, cans and glass. The carts take up less space and can be placed outside next to the garbage dumpsters.

Depending on the size and layout of the business, it may be possible to store the recycling carts inside the facility and then wheel them outside on collection day. For large office buildings, recycling collection bins should be located on each floor or in a common area inside the building and then brought down to a centralized area for consolidation. In some situations it might make sense for businesses to share recycling containers/service.

#### 2.2.1.2 Multifamily Buildings

For multifamily buildings with several outdoor garbage collection points, recycling containers should be located next to every garbage dumpster so residents have the option to recycle when disposing of their trash. Some larger apartment buildings have recycling collection bins inside the building and then maintenance staff transport the materials outside for collection.

Also, many residents lack adequate space inside their apartment to store recyclable materials. The County may want to consider providing small recycling containers to each dwelling unit to transport recyclable materials to a central collection location. Examples include small 5- to 10-gallon bins or reusable cloth tote bags. A list of companies that provide recycling bins and tote bags well-suited for apartment recycling is provided in Appendix B. Another option to address storage issues would be for apartment buildings to have recycling collection bins on each floor or in a common area inside the building. However that would require the building staff (or a dedicated resident) be responsible for transferring the materials from the inside bins to the larger collection containers located outside. It is also important to ensure that, if possible, central recycling containers are located in high-traffic areas or areas that are

frequented by residents – near the trash bin is ideal. The recycling/trash area should also be clean and well-lit.

## 2.2.2 High Turnover Rates

### 2.2.2.1 Commercial Property Owner/Lease Company Turnover

Commercial property is bought and sold periodically resulting in changes to a building's owner or leasing company. As a result of these changes, the recycling program can sometimes suffer. Some owners and leasing companies may view recycling as a high priority, while others may not. If a property owner or leasing company does not consider recycling a high priority, collection programs put in place by the previous owner may fall by the wayside, resulting in an increase in the quantity of garbage collected. This is especially true if recycling laws are not enforced and/or education is weak.

Considerations for improvement include creating recycling information packets specifically designed for commercial property owners and leasing companies. The information could include detailed waste reduction, reuse, and recycling tips to be forwarded to building tenants, as well as a copy of the County's recycling ordinances. The packets could even be tailored for specific business types such as offices, retail businesses, restaurants, etc. The local Chamber of Commerce could be enlisted to distribute the information packets to new businesses as they open in the County, as well as distribute information to current businesses.

Another approach is to ask building managers to provide the County with names and addresses of new commercial tenants on a monthly or quarterly basis so that the County can send out information packets as needed.

### 2.2.2.2 Business Manager Turnover

Just as commercial property is bought and sold periodically, managers of commercial property, retail businesses, and multifamily properties turn over periodically. Knowledge and enthusiasm about recycling programs and responsibilities can wane when such turnover occurs.

If not already created, a database of businesses in the County could be generated and letters sent annually asking for updated contact information. The County could inquire about any recycling issues, or the need for more information packets, signage, etc. The County might consider hosting an event periodically where a working session could be conducted in order to gain an understanding of specific barriers business managers face, and allow the sharing of information and suggestions among managers. Functions like these often motivate managers to reinvigorate their recycling program, and also show that the County is interested in helping, not just enforcing. Providing this information by email to businesses could save the County money on publishing and mailing information, as well as reduce the consumption of paper.

### 2.2.2.3 Resident Turnover

Because the nature of apartment building living isn't always a long-term living arrangement for a majority of tenants, there tends to be a constant flow of incoming and outgoing residents.

To combat this, a "new resident" information packet could be created that is specifically designed for multifamily residents and provides recycling and waste reduction information. Packets could be provided to apartment managers and ask that they be delivered to each new resident. County staff should work with building owners, managers, and condo associations to ensure this is carried out in order to be successful. Or apartment managers could be asked to provide the County with names and addresses of new residents on a monthly or quarterly basis so that the County can send out information packets. For examples of multifamily recycling information created by other municipalities, as well as a list of multifamily recycling resources, see Appendix C.

### 2.2.3 Minimal Incentive to Recycle at Multifamily Buildings

In most cases, residents in multifamily dwelling units do not receive a separate bill for garbage and recycling services, as fees for these services are usually prorated and each unit's portion is included in their monthly rent. Consequently, there is not a financial incentive for the tenants to recycle or reduce the amount of garbage they generate. Furthermore, there is little accountability for residents, as it is not known who is recycling and who is not.

The County could consider conducting a survey of residents from multifamily buildings with low participation rates in an attempt to understand residents' particular needs and obstacles to recycling. A sample survey is provided in Appendix D.

Another angle is to promote environmental stewardship by asking residents to recycle, conserve natural resources and to take responsibility for protecting the County's environment. The building manager, County staff, and/or volunteers (for example, environmental club high school students) could set up a recycling education "booth" on-site (perhaps as people are returning from work) to distribute information about the environmental benefits of recycling. This, in conjunction with the distribution of apartment-sized recycling bins or tote bags, would demonstrate to the residents the commitment to recycling by the County and the building manager/owner. It would also provide effective one-on-one recycling education and provide residents with the opportunity to have their recycling questions answered.

### 2.2.4 Recycling and Waste Reduction Education

Providing recycling information to commercial establishments and residences in large multifamily buildings can be difficult due to the potentially high turnover rate of multifamily residents and property owners and/or managers. Suggested improvements to increase recycling are outlined in the sections below.

### 2.2.4.1 Recycling Education

General recycling reminders should be provided at least once per year to all residents and businesses. As mentioned earlier, information packets for commercial businesses, or at least new establishments, is one way to get the message out. Listed below are other recommendations for improving recycling public education to the CII sector and multifamily residents.

- **Website** – Many people look for recycling information on their municipalities’ website. The Internet is a relatively low-cost means of providing information. In addition to the current recycling guide, it is recommended that the County add more detailed commercial and multifamily recycling information and tips/suggestions to its website, so businesses and residents have a source to turn to for easily accessible information. See Appendix C for examples of other municipalities’ websites specifically designed to provide information regarding commercial and multifamily recycling.
- **Clear Signage** – Recycling areas should have clear signage, both on the containers and above containers (e.g., posters), if possible, explaining which recyclable items should be placed in each container. Text should be large and bold and signage with pictures is generally preferable.
- **Promotional Items** – Promotional items such as pens, magnets, calendars, etc. (specifically made with recycled-content materials) are an inexpensive way to convey the County’s recycling message to businesses and multifamily residents in a way that has the potential to be seen over and over again.
- **Brochure or Flyer Developed Exclusively for Multifamily Residents** – A recycling brochure or a flyer should explain the basics of the County’s recycling program, including what materials are accepted in the program and how to prepare the items for collection. Ideally, additional information addressing apartment building recycling issues would be most beneficial. In addition, residents should be reminded that garbage and recycling collection services are not free, but are included in their rent and if the amount of garbage increases, it may result in the need for increased collection service (i.e., larger garbage containers or more frequent collections per week), which could result in an increase in rental fees.

Public education pieces that are sent through the mail and addressed to the resident by name are more likely to be read than items addressed to “Resident.” However, if the cost of postage is prohibitive, the County could hand-deliver brochures to each multifamily building or property manager and ask that they distribute the information to their tenants. In general, brochures are most effective when they are printed in more than one color and have pictures or drawings to emphasize the message. Also, in communities with large populations of non-English speaking residents, brochures printed in additional languages and/or brochures that feature pictures, not words, help to educate more of the population.

- **Door Hangers for Multifamily Buildings** – Because multifamily residents are often “on the go,” delivering door hangers to their apartments may be a convenient and effective means of providing a friendly reminder about the recycling program.
- **Letter to Multifamily Building Managers and Landlords** – By sending a separate letter directed toward multifamily building managers and landlords (especially if addressed to the individual by name), the County may achieve better recycling participation from multifamily dwelling units. The letter should not only reference the County’s Mandatory Source Separation Law, but also offer assistance in the form of a site visit or site audit, especially for buildings that are struggling with participation or contamination issues. If at all possible, County staff should periodically deliver printed materials to building managers and landlords, and while on-site, visit the recycling area(s). If warranted, suggestions for improving the site should be provided to the manager or landlord.
- **Workshops for CII Property Owners/Managers, Multifamily Building Managers and Landlords** - The County currently contracts with Cornell Cooperative Extension (CCE) for direct educational outreach. CCE could be tasked with hosting recycling workshops specifically designed for CII and/or multifamily building managers and landlords as a way to improve recycling and overcome recycling barriers at these specific types of buildings.

Provided below are broader recommendations for developing effective public education materials. Some of these options may not be financially feasible for the County, but they are included here for future consideration.

- When designing public education brochures and information pieces, consider using a consistent “look” in all pieces (i.e., use the same font, colors, logo, mascot, etc.). Residents will eventually recognize these as recycling information pieces and will hopefully save them and reference them when needed.
- Increase the public education budget to expand the visibility of the County’s recycling program. It is recommended that at least \$1.50 per household, per year, be budgeted for public education.
- Consider partnering with the County’s Environmental Management Council (EMC) for dissemination of public education and outreach information. The EMC is the County’s citizen advisory board for local environmental matters. Each year the EMC budgets for staff support, technical assistance, planning, and research and development assistance to the County’s Solid Waste Management Division.<sup>2</sup>
- Consider hiring a college intern or part-time staff person to help with CII and multifamily recycling-related tasks.

---

<sup>2</sup> For 2009, the EMC’s proposed budget to assist the Solid Waste Management Division was slightly less than \$10,000, a portion of which is allocated for planning and technical assistance.

#### 2.2.4.2 Waste Reduction Education for Businesses

The advantages of waste reduction are numerous. Waste reduction impacts the economic health of all types of businesses, from corner stores to international corporations. For industrial entities (e.g., those manufacturing goods), there is a built-in economic incentive to minimize waste, as inputs are generally purchased, and no business wishes to waste a commodity.

The County could consider providing businesses with waste reduction education and tools to assist with:

- **Estimating Disposal Costs** – Many businesses are unaware of the cost savings that can be attributed to waste reduction and recycling. Worksheet A in Appendix E provides the steps and equations to estimate disposal costs.
- **Conducting a Waste Analysis** – Businesses can gain valuable knowledge by conducting a waste analysis or composition study of their waste stream. Worksheet B in Appendix E provides options for estimating the types and quantities of materials in a company’s waste stream. With this information, a business can increase its recycling efforts to capture recyclable materials that are currently being thrown in the garbage. A waste analysis also provides insight to where waste reduction efforts could be focused. For example, large quantities of paper towels from restrooms could be reduced by installing hand dryers or cloth towels; and large quantities of paper cups in the waste stream could be eliminated by using ceramic mugs or glassware. There is potential to realize cost savings due to decreased number of pulls for disposal or decreased size of disposal containers. If the County were able to hire a college intern or part-time staff person, they could provide waste analysis assistance to businesses.
- **Tracking Progress** – As with the United Way Campaign and other similar charities, a “thermometer-like” poster that shows progress to date can help motivate employees to recycle.
- **Marketing** – Many cities and counties provide free marketing to businesses that implement and maintain successful recycling programs. Examples include mention in the municipal newsletter, on a web page, or a sticker placed on the front door of the business, which will appeal to environmentally-conscious customers. This method of “social marketing” is increasing in popularity as individuals are more frequently weighing how “green” a business is when deciding which businesses to support.
- **Incentives and Award Programs** – Businesses should recognize individual employees and departments that are particularly successful in reducing waste.

To encourage businesses to institute waste reduction strategies, the following messages should be conveyed:

**Economic gain** – Controlling raw material waste and reducing waste disposed are increasingly important business goals, which can often result in reduced costs. Worksheets C and D in Appendix E can assist with evaluating the costs of a waste

reduction or recycling program as well as calculating avoided collection and disposal costs.

**Enhanced product and business image** – The benefits of waste reduction extend beyond the short-term economic advantages. U.S. consumers are increasingly changing purchasing habits based on the environmental records of products and companies with sustainable goals.

**Improved employee morale** – Waste reduction programs have also served as an effective tool for improving employee morale. Many programs provide ideal opportunities to involve employees in organizational decision making and team work.

The County and its cities, towns, and villages have the opportunity to set an example for reducing waste by implementing source reduction policies and directives in-house. Similar to waste assessments for businesses, County and municipal staff should conduct site visits at all government offices and buildings to not only improve recycling efforts, but also look for opportunities to increase source reduction.

### 2.2.5 Enforcement of Recycling Regulations

Broome County mandates that all businesses and residents separate their recyclable materials from the waste stream for collection under the County's Mandatory Source Separation Law (Chapter 179, Article IV of the Broome County Charter and Administrative Code). Materials that must be source-separated include paper, glass, metals, plastics, leaves, yard wastes, tires, batteries and household hazardous waste (HHW), per Section 179-26.B of the Code.

While this law is difficult to enforce, the County should consider tracking CII and multifamily recycling program data by conducting an inventory of each business and multifamily building to determine what recycling services are currently being offered. This could be a daunting task if done manually, however the County could survey the sites via a form letter or provide the option of submitting data electronically by implementing a web-based data collection program, so that businesses and multifamily buildings can conveniently report what type of recycling program they have in place. Eventually the program could be expanded to track tonnage data and become a tool for the County to monitor its waste diversion programs and concentrate its efforts on areas identified as needing improvement.

For example, a company called Emerge<sup>3</sup> offers a web-based program called Re-TRAC™. Their program is designed to assist communities in managing their data and reporting activities by allowing users to:

- Collect MSW and recycling data over the Internet;
- Keep data organized in a searchable, secure database;
- Conduct program performance analyses; and
- Automatically generate annual reports.

---

<sup>3</sup> Website: <http://www.emergeknowledge.com/>

Some municipalities use Re-TRAC to efficiently obtain and track MSW and recycling tonnage data. Lancaster County (PA) Solid Waste Management Authority implemented Re-TRAC as a way to reduce its staff's time that had been spent collecting, organizing and reporting MSW and recycling data and is so far pleased with the results<sup>4</sup>.

Once the County has established an inventory of CII and multifamily recycling programs and service levels, it can work to achieve the following:

- Determine sites with low recycling participation rates;
- Target individual multifamily buildings or businesses;
- Determine why residents or employees within those buildings do not recycle; and
- Develop specific strategies for increasing recycling within these businesses or buildings.

### 2.3 Implementation Requirements

Implementing an advanced CII and multifamily recycling program would likely require additional staff time (plus assistance from CCE, the EMC or a college intern) because one of the main components to a successful program is increased education.

In addition, coordination with the recycling haulers is key to making the program a success. In Broome County, the majority of CII sites and multifamily buildings are serviced by private haulers. In certain cities or towns, municipal crews may service businesses and apartment buildings. Depending on the hauler, the recyclable materials are collected either commingled in one container (single-stream) or the fiber is kept separate from the glass, metal and plastic containers (dual-stream). The collection method is determined by the hauler and/or processor. This could require that some of the education materials be tailored to a particular collection method.

### 2.4 Capital and Operating Expenses

The capital and operating expenses to implement an advanced CII and multifamily recycling program would be dependent on what ideas or recommendations the County chooses to implement. As stated in Section 2.3, Implementation Requirements, an advanced recycling program would likely require additional staff time for increased education efforts (including designing and distributing education pieces, website development, etc.), possible site visits and audits, additional data tracking, etc. Capital expenditures could include, but not be limited to, the purchase of promotional and education pieces, the purchase of software for a data collection program, and the purchase of bins or tote bags for multifamily units.

---

<sup>4</sup> Source: Re-TRAC Client Profile, "Re-TRAC Performance Exceeds Expectations in Lancaster County." [http://www.emergeknowledge.com/pdfs/Lancaster\\_Profile.pdf](http://www.emergeknowledge.com/pdfs/Lancaster_Profile.pdf)

## 2.5 Diversion Potential

By implementing an advanced CII and multifamily recycling program, the County could see significant increases in waste diversion. The extent of the diversion is difficult to measure, as it would be dependent on how much staff time and financial resources the County plans to dedicate to these programs.

It is likely that with each additional recycling program improvement, expansion, policy, or service level, the County would most likely see an increase in diversion. This issue paper provides numerous suggestions for improving or enhancing CII and multifamily recycling programs, including:

- Passing an ordinance that requires adequate outside space be designated for the placement of recycling collection containers at new CII or multifamily sites;
- Providing small recycling containers or bags to each multifamily dwelling unit to transport recyclable materials to a central collection location;
- Creating recycling information packets specifically designed for commercial property owners and leasing companies;
- Hosting a working session with business managers to discuss barriers to recycling and offer information and suggestions for improving recycling in the workplace;
- Creating a “new resident” recycling and waste reduction information packet specifically designed for multifamily residents;
- Designing and distributing multifamily recycling educational tools such as flyers, brochures, door hangers, promotional items (calendars, pens, magnets), etc.;
- Conducting a survey of residents from multifamily buildings with low participation rates;
- Expanding the commercial and multifamily recycling information on the County’s website;
- Providing CII sites and multifamily buildings with standard, consistent signage for recycling areas including posters and labels for collection containers;
- Hiring a college intern or part-time staff person to help with CII and multifamily recycling-related tasks;
- Conducting waste analyses or composition studies for businesses;
- Enforcing mandatory recycling regulations; and
- Tracking CII and multifamily recycling program data either manually or via a web-based data collection system.

Obviously, the more time and effort the County can put towards CII and multifamily recycling issues, the greater the potential of increasing recycling participation and waste diversion.

## 2.6 Addressing Stakeholder Concerns

The stakeholders most impacted by changes to the County's CII and multifamily recycling programs include business and multifamily building owners/managers and recycling haulers.

To address stakeholder concerns, it is recommended the County work with the EMC's Recycling and Waste Management Committee or form an advisory or ad-hoc committee to promote dialogue between the major players. The committee could consist of County staff, recycling collection haulers, landlords/building owners/managers, business owners and managers, and condominium or homeowner association representatives. Discussions should include what is working, what obstacles to collecting recyclable materials are the haulers encountering, what do business owners perceive to be barriers to recycling, what are the obstacles to increasing participation, etc. The group should be encouraged to share ideas and examples of successful programs, and work together to solve CII and multifamily recycling issues. A pilot study could be coordinated among willing haulers and businesses or multifamily buildings as a way to test a new collection approach, or education tactic. The committee approach allows haulers and business and multifamily managers to see each others' perspectives, which can be invaluable.

## 2.7 Benefits and Drawbacks

Implementing an advanced CII and multifamily recycling program has benefits as well as drawbacks, as outlined below.

### 2.7.1 Benefits

The benefits to the County may include, but not be limited to the following:

- A potential increase in recycling participation from businesses and multifamily buildings;
- A potential increase in the quantities of recyclable materials collected in the County;
- A potential decrease in the amount of waste disposed at the Broome County Landfill, thus increasing the life of the Landfill;
- A potential increase in cost-savings for business and multifamily building owners as a result of downsizing solid waste collection container sizes and/or service frequency levels; and
- An overall increase in awareness of recycling and environmental-related issues.

### 2.7.2 Drawbacks

The drawbacks to implementing an advanced CII and multifamily recycling program are strictly financial. Most program additions or enhancements would require the County to increase funding for additional staff and expenses.

It should also be noted that by increasing the quantities of recyclable materials collected, the County could see an increase in processing fees charged by Waste Management (WM) Recycle America in Binghamton, if the materials were brought to that particular materials recovery facility (MRF). The County has a contract with WM Recycle America for recyclable materials processing, however haulers and municipalities may choose to deliver their materials to any of the four MRFs in the region. Any fees paid for the processing of recyclable materials are collectively less expensive when compared to the cost of landfill disposal on a per ton basis or per cubic yard of air space.

However, when considering the “cost” of recycling programs there are both “economic” considerations and “non-economic” considerations. Under economic considerations, the County must compare the cost of recycling programs with the cost of landfill disposal, including transportation costs and long term disposal obligations after the landfill is closed (post-closure obligations). For “non-economic” considerations there are factors such as environmental sustainability, carbon footprint, public desire for and participation in recycling, and New York State Rules and Regulations. These factors should all be considered as the County formulates its integrated solid waste management planning efforts.

# Appendix A

## Examples of Space Requirements For Recycling Containers at Commercial and Multifamily Buildings

---

### "Trash and Recycling Enclosures - Design Considerations," City of Fort Collins Guidance Document, August 2004

<http://www.ci.fort-collins.co.us/recycling/pdf/enclosure-guidelines0804.pdf>

#### Space Allocation

How much space is adequate for the collection and loading of recyclable materials? This is a hard question to answer due to the variability in development types and collection methods.

The amount of space provided for the collection and storage of recyclable materials shall be designed to accommodate collection and storage containers consistent with the recyclable materials generated. It is recommended the area be at least as large as the amount of space provided for the collection and storage of refuse materials.

**Estimating area needed: (please note this is in addition to space needed for trash service)**

Type of Occupancy	Amount of Space Required Over and Above Standard Refuse Bin Requirements
Multi-Family	100 square ft. for the first 10 units and 5 square ft. for each additional unit
Commercial	10,000 sq. ft. and above 100 sq. ft. for the first 10,000 sq. ft. (gross) and 5 sq. ft. for each additional 1,000 sq. ft. (gross)

Container Type	Dimensions	Square Feet (container only)
40 yard bin	8' x 20-24' / 8' deep	160-192
20 yard bin	8' x 20-24' / 4' deep	160-192
3 yard bin	4' x 3' / 3'-4' deep	12
2 yard bin	4' x 2' / 3'-3½' deep	8

Vehicle Type	Access Requirements/Concern
Front loader	25 ft. vertical clearance.
Rolloff	25–30 ft. vertical clearance, 60–70 ft. horizontal distance. The greater vertical clearance, the smaller horizontal distance required.
Stake bed	Access to containers only. Forklift access may be required.
Recycling vehicle/ Compartmentalized truck	Access to containers only.

### **“Recycling Guidelines for Multifamily Housing Design,” StopWaste.org, Alameda County, California**

<http://www.stopwaste.org/docs/1720381662005mfu-designguidelines.pdf>

#### **How much space is needed for the collection company’s containers?**

##### **Container Volume**

The companies that collect garbage and recyclables will provide carts and/or bins to hold those materials prior to collection. The size and number of these containers will depend on the number of people or units in the project and possibly on the frequency of collection. For once-a-week collection (the norm), a reasonable rule of thumb is to provide ¼ cubic yard (cy) of container capacity for every three residents. This can be a mix of garbage bins and recycling carts (or bins), with about half of the volume for garbage and half for recycling. For example, a 60-unit complex with average occupancy of three people per unit would require 15 cubic yards of capacity (0.25 cy x 60). If the collection company uses 4-cubic-yard bins for garbage and 64-gallon carts for recyclables, this could be served by two bins and 22 carts. It is good practice to provide 20% to 35% excess capacity for seasonal variation, so in this example the design objective should be to accommodate three bins and 28 carts. Local demographics may change these assumptions; large or extended families will require more space; and senior citizens living alone may require less.

##### **Storage Space Floor Area**

Bin sizes can vary in all dimensions; check with the local collection companies for exact dimensions. The typical footprint of a bin is about 7 feet wide and 4 feet deep. A 4-cy bin with these dimensions would be between four and five feet tall. Most 64-gallon carts fit snugly in a footprint that is 32x30 in.; they are about 42-in. tall. Bins and carts typically have hinged lids that must be lifted; these can damage low ceilings. In addition to space for the containers themselves, space is needed to walk among them and shift them around. An area that is 150% of the sum of bin and cart footprints should suffice, unless the available area is unusually thin or oddly shaped; then more space may be needed.

Continuing with the example above, if the 60 units are in three buildings, each with an outdoor enclosure for discards, then each enclosure should accommodate one bin plus nine carts, having a total footprint of:

$$(7 \times 4) + 9 \times (32 \times 30) / 144 = 88 \text{ square feet}$$

Each enclosure should provide 150% of 88 square feet, or 132 square feet (inside dimensions). A pair of 9-foot-wide parking spaces can provide this capacity.



# Appendix B

## Resource List of Recycling Bin and Tote Bag Vendors and Manufacturers

---

Provided below is a list of recycling bin and tote bag vendors and manufacturers that offer appropriate-sized containers for apartment recycling. R. W. Beck does not endorse any particular vendor or manufacturer, nor does it claim that this list is complete.

### **Adco Marketing**

300 Tamal Plaza, Suite 220  
Corte Madera, CA 94925  
Phone: 415-927-2881  
Toll Free: 888-332-ADCO (2326)  
<http://www.adcomarketing.com/totebags.htm>

### **Awareness Ideas**

Flexi Display Marketing, Inc.  
801 Stephenson Hwy.  
Troy, MI 48083  
Phone: 800-875-1725  
<http://www.awarenessideas.com/SearchResults.asp?Search=tote+bags>

### **The Bag Connection, Inc.**

459 SW 9<sup>th</sup> Street  
Dundee, OR 97115  
Phone: 800-622-2448  
<http://www.bagitsystem.com/MultiFamily.htm>

### **Busch Systems International, Inc.**

343 Saunders Road  
Barrie, Ontario Canada L4N 9A8  
Phone: 705-722-0806  
Toll Free: 800-565-9931  
<http://www.buschsystems.com/home-apartment-kitchen-recycling-bins.html>

### **Enviro-Tote**

4 Cote Lane  
Bedford, NH 03110-5805  
Phone: 603-647-7171  
Toll Free: 800-TOTE BAG (868-3224)  
<http://www.enviro-tote.com/index.html>

## Appendix B

---

### **Recycled.CA**

46 LePage Court  
Toronto, Ontario Canada M3J 1Z9  
Phone: 416-638-9895

[http://www.recycled.ca/Products/product\\_list.htm](http://www.recycled.ca/Products/product_list.htm)

### **Weisenbach Recycled Products**

437 Holtzman Avenue  
Columbus, OH 43205  
Phone: 800-778-5420

[http://www.recycledproducts.com/?search\\_type=products&search\\_field=tote+bags&cid=12  
&s\\_type=ALL](http://www.recycledproducts.com/?search_type=products&search_field=tote+bags&cid=12&s_type=ALL)

# Appendix C

## Commercial and Multifamily Recycling Public Education Programs, Examples, and Resources

---

Provided below is a list of various resources and public education examples related to commercial and multifamily recycling.

### Stopwaste.org (Alameda County, California)

This organization's website contains comprehensive information for business & industry and a Best Practices page for apartment building managers.

- <http://www.stopwaste.org/home/index.asp?page=4>
- <http://www.stopwaste.org/home/index.asp?page=507>

### City of Beaverton, Oregon

The City's "2008 Beaverton Recycling Guide" includes information for apartment building residents and recycling at work.

- <http://www.beavertonoregon.gov/departments/recycling/apartments/docs/BOOKLET.pdf>

### Eureka Recycling (St. Paul, Minnesota)

This private recycling hauler and processor created a multifamily recycling toolkit titled "Exploring Multifamily Recycling: Tools for the Voyage." In addition to the comprehensive information provided in this toolkit, it also contains templates for posters, door hangers, labels, signage, etc.

- <http://www.eurekarecycling.org/Tools.cfm>

### City of Philadelphia, PA

Commercial Solid Waste and Recycling Plan form, for multifamily, commercial, and institutional establishments:

- <http://www.phila.gov/STREETS/RecComWaste.pdf>

Recycling Alliance of Philadelphia - Information on commercial recycling:

- [http://www.cleanair.org/recyclingalliance/rec\\_phila.html#12](http://www.cleanair.org/recyclingalliance/rec_phila.html#12)

Greater Philadelphia Commercial Recycling Council website - contains success stories, tips and tools:

- <http://www.gpcrc.com/index.asp>

## Appendix C

---

### Pennsylvania Department of Environmental Protection (PA DEP)

Developing a Recycling Program for Commercial, Institutional & Municipal Establishments:

- <http://www.dep.state.pa.us/dep/deputate/airwaste/wm/recycle/FACTS/Comrec2.htm>

### City of Austin, Texas

The City of Austin mandates that certain businesses, depending on size, must provide on-site recycling service. The following must provide recycling service: 1) multi-family properties with 100 or more units; and 2) commercial businesses and building owners with 100 or more employees. Businesses and office buildings must provide recycling of at least two of the following materials: aluminum cans, tin/steel cans, glass containers, plastic bottles, newspaper, mixed office paper, and cardboard. Multi-family complexes must provide recycling of at least four of the following materials: aluminum cans, tin/steel cans, glass containers, plastic bottles, newspaper, cardboard, kraft paper bags, and home office paper. New employees and tenants must be informed about the recycling program and all employees and tenants must be re-educated about the program at least annually.

A recycling plan must be filed with the City's Solid Waste Services Department and a quarterly volume report must be submitted to the Department. (Recycling haulers may file volume reports for their clients.)

- <http://www.ci.austin.tx.us/sws/recyclerules.htm>

### RethinkWaste.org (San Mateo County, California)

The South Bayside Waste Management Authority provides specific recycling information on its website for businesses and multifamily dwellings.

- <http://www.rethinkwaste.org/businesses>
- <http://www.rethinkwaste.org/residents/multi-family-dwellings/recycling-services>

### City of Portland, Oregon

The City's Bureau of Planning and Sustainability has comprehensive web pages dedicated to recycling at work and multifamily recycling, including a page for multifamily property owners and managers.

- <http://www.portlandonline.com/osd/index.cfm?c=45520&>
- <http://www.portlandonline.com/osd/index.cfm?c=41466>

### Portland Metro

Portland Metro offers tools and resources for recycling at work in the Portland, OR metropolitan region and a property managers guide for multifamily recycling.

- <http://www.metro-region.org/index.cfm/go/by.web/id/537>

- <http://www.oregonmetro.gov/index.cfm/go/by.web/id=28771>

### Seattle Public Utilities (SPU)

This comprehensive website provides outreach, education, and technical assistance to businesses in the Seattle area.

- <http://www.resourceventure.org/>

SPU also provides detailed information for apartment recycling.

- [http://www.ci.seattle.wa.us/util/Services/Recycling/Recycle\\_at\\_Your\\_Apartment/index.asp](http://www.ci.seattle.wa.us/util/Services/Recycling/Recycle_at_Your_Apartment/index.asp)

### Minnesota Pollution Control Agency (MPCA)

The MPCA has website pages dedicated to recycling in the workplace:

- <http://www.pca.state.mn.us/oea/p2/waste.cfm>
- <http://www.reduce.org/workplace/>

### LessisMore.org (Santa Barbara County, CA)

Santa Barbara County has webpages dedicated to business recycling and multifamily recycling:

- [http://www.lessismore.org/Programs/bsnss\\_recycling\\_complete.html](http://www.lessismore.org/Programs/bsnss_recycling_complete.html)
- <http://www.lessismore.org/Programs/multifamilyrecy.html>



Appendix D  
Multifamily Dwelling Recycling  
Sample Residential Survey

---



# We need your input!

Hinton Heights Management is looking for ways to improve its recycling program for its residents. Currently, 2 outside recycling bins, near the main complex entrance, are provided for residents to drop off their recycling. The following questions will help management better meet resident's recycling needs. **Please return your completed survey to the Rental Office by Friday, September 14.**

Please check the box most appropriate.

Do you use Hinton Heights's current recycling containers?

- Yes
- No

If "yes", what do you recycle?

- Food and beverage cans
- Glass bottles and jars
- Plastic bottles
- Newspaper
- Mixed paper and junk mail

If "no", which of the following come close to your reasons? (check all that apply)

- I didn't know that there was a recycling program at Hinton Heights.
- There is not an outside recycling bin close to my apartment.
- It's too much trouble to carry out the recyclables.
- I don't have enough space in my apartment to store recyclables.
- I don't have enough recyclables to make it worthwhile.
- I'm not sure how to recycle.
- It's something I just forget to do.
- I don't know what things I can recycle.
- I don't know where the outside recycling bins are.
- Other \_\_\_\_\_

Who primarily takes out your garbage or your recycling?

- Yourself
- Your child(ren)
- Your spouse/partner
- Other \_\_\_\_\_

(OVER)

How often is your garbage taken out to the dumpsters?

- Daily
- Once a Week
- Twice a Week
- Every Other Week

How often is your recycling taken out to the recycling bins?

- Daily
- Once a Week
- Twice a Week
- Every other Week
- Never

How could we improve our recycling program for you? (You may check more than one).

- Have outside recycling bins near every garbage dumpster.
- Provide a recycling container to store and carry out recycling to the outside recycling bins.
- Provide pamphlets describing what can be recycled.
- Give out recycling reminders.
- Post better signs at the recycling area.
- Other \_\_\_\_\_  
\_\_\_\_\_

If additional recycling containers were provided near every dumpster, would you start recycling or would you recycle more?

- Yes
- No
- 

Comments: \_\_\_\_\_  
\_\_\_\_\_

**Please return your completed survey to the Rental Office by Friday, September 14.**

Thank you for your time. We appreciate your comments!

# Appendix E Commercial Recycling Worksheets

---



# Worksheet A: Estimating Disposal Costs

## Off-Site Waste Removal

**A. Name of waste removal company** \_\_\_\_\_

Telephone number \_\_\_\_\_ Date contract expires \_\_\_\_\_

---

### **B. Removal Schedule**

Number of times \_\_\_\_\_ Per (day/week/month/other) \_\_\_\_\_

Days of week \_\_\_\_\_ Time(s) of day \_\_\_\_\_

---

Choose one of the following equations (C1, C2 or C3):

#### **C1. Waste removal charge (If charged as flat fee or part of rent)**

$$\frac{\text{_____}}{\text{Waste removal fee}} \times \frac{\text{_____}}{\text{Number of Times per Year}} = \frac{\text{_____}}{\text{TOTAL WASTE DISPOSAL}}$$

---

#### **C2. Waste removal charge (If charged by weight or volume)**

$$\frac{\text{_____}}{\text{Waste removal charge per unit of weight or volume}} \times \frac{\text{_____}}{\text{Number of units of waste removed of waste (from receipts or call haulers)}} = \frac{\text{_____}}{\text{Annual waste removal charge}}$$

If applicable, add:

$$\frac{\text{_____}}{\text{Hauling container(s) rental fee per time periods}} \times \frac{\text{_____}}{\text{Number of time periods per year}} = \frac{\text{_____}}{\text{Annual container cost}}$$

$$\frac{\text{_____}}{\text{Annual Waste Removal Cost}} + \frac{\text{_____}}{\text{Annual Container Cost}} = \frac{\text{_____}}{\text{Total Waste Disposal Cost}}$$

---

#### **C3. Waste removal charge (If charged per pull)**

$$\frac{\text{_____}}{\text{Charge per pull}} \times \frac{\text{_____}}{\text{Pulls per year}} = \frac{\text{_____}}{\text{Annual waste pulling charge}}$$

If applicable, add:

$$\frac{\text{_____}}{\text{Hauling container(s) rental fee per time period}} \times \frac{\text{_____}}{\text{Number of time periods per year}} = \frac{\text{_____}}{\text{Annual Waste container rental cost}}$$

$$\frac{\text{_____}}{\text{Annual waste pulling charge}} \times \frac{\text{_____}}{\text{Annual waste container rental cost}} = \frac{\text{_____}}{\text{Total Waste Disposal Cost}}$$

---



# Worksheet B: Conducting a Waste Analysis

The following are two options for estimating the types and quantities of materials in a company's waste stream. This knowledge will aid you in targeting materials for recycling and reduction and in contacting recyclers.

## Method I

This Method involves visually monitoring the dumpster each day and keeping track of the following:

- What materials are visible in the dumpster?
- What materials take up the largest volume in the dumpster?
- How full is the dumpster?

If the majority of a company's waste is placed in garbage bags before disposal, have cleaning staff use different colored bags for each area. For example, put the waste from the offices in clear bags, the cafeteria waste in white bags, the restrooms' in blue bags, the production waste in black bags, etc. This will help to identify the areas which are generating the most material. Then, walk through those areas to see what is being thrown away. In the above example, we could assume that the clear bags contained primarily office paper.

## Waste Analysis Estimation – Method 1

Day observed \_\_\_\_\_

How full \_\_\_\_\_

Materials Visible

Estimated Percentage of Waste Stream

---

---

---

---

---

---

---

---

Color of bag

# in dumpster

Type of waste generated in the designated area

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

-----

## Method 2

This method provides a more accurate estimation of the quantity of material in the waste stream. Place a container near the dumpster or in a central location and designate it for your targeted material. Notify all employees that, for a specified period of time, all of the targeted material will be placed in this container rather than the dumpster. With certain materials, such as OCC, it may be possible to have one employee or the cleaning staff segregate the material. For other materials, such as office paper, all employees will need to be involved. Note that the container must be under shelter.

Continue the sort for at least two weeks. At the end of the specified time period, record the quantity of material accumulated. Contact the local recyclers listed in the back of this guide to find one that will pick up or allow you to drop-off the sorted material for recycling.

### Waste Analysis Estimation – Method 2

Material sorted \_\_\_\_\_ Time period sorted \_\_\_\_\_

$$\frac{\text{_____ cubic yards}}{\text{Size of containers}} \times \frac{\text{_____}}{\text{Number of containers}} = \frac{\text{_____ cubic yards}}{\text{Amount sorted}}$$

$$\left( \frac{\text{_____ pounds}}{\text{Weight of full Container}} - \frac{\text{_____ pounds}}{\text{Weight of empty container}} \right) \times \frac{\text{_____}}{\text{Number of containers}} = \frac{\text{_____ pounds}}{\text{Amount sorted}}$$

Extrapolate this amount to a month or year. This information will be extremely useful when contacting recyclers and determining the cost-effectiveness of your recycling program.

$$\left( \frac{\text{_____ pounds}}{\text{Amount sorted}} \div \frac{\text{_____}}{\text{Number of weeks Of sort}} \right) \times 52 \text{ weeks/year} = \frac{\text{_____ pounds}}{\text{Targeted material discarded per year}}$$

# Worksheet C: Evaluating the Costs of a Waste Reduction or Recycling Program

## Monthly Program Costs

Additional labor (cleaning/maintenance staff)	\$ _____
Additional energy requirements	\$ _____
Transportation	\$ _____
Additional space requirements	\$ _____
Education/promotion	\$ _____
Record keeping	\$ _____

## START-UP COSTS (AMORTIZED MONTHLY)

Containers	\$ _____
Equipment (if any)	\$ _____
Other:	\$ _____
<b>Total Program Costs</b>	<b>\$ _____</b>

## Monthly Program Savings and Revenues

Avoided collection/disposal costs (See Worksheet D)	\$ _____
Decrease in new material costs	\$ _____
Revenues from sale of recyclables	\$ _____
Avoided purchases	\$ _____
Avoided labor (cleaning/maintenance staff)	\$ _____
<b>Total Program Savings/Revenues</b>	<b>\$ _____</b>
 <b>Total Program Savings/Revenues – Total Program Costs</b>	 <b>\$ _____</b>



# Worksheet D: Calculating Avoided Collection/Disposal Costs

Material targeted for recycling or waste reduction \_\_\_\_\_

Approximate percentage of waste stream \_\_\_\_\_

## By Volume

Use this formula if you used a visual estimate of the waste stream or if you calculated volumes in the waste sort.

$$\begin{array}{r}
 \text{_____} \\
 \text{\% of material} \\
 \text{(by visual estimation} \\
 \text{or sort)}
 \end{array}
 \times
 \begin{array}{r}
 \text{_____} \\
 \text{Total cubic yards disposed} \\
 \text{(ex.: 4 cubic yard dumpster emptied} \\
 \text{3 times per week = 12 cubic yards} \\
 \text{or 48 cubic yards per month.)}
 \end{array}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{Targeted for} \\
 \text{diversion}
 \end{array}$$

$$\begin{array}{r}
 \text{_____} \\
 \text{cubic yards} \\
 \text{Targeted for diversion}
 \end{array}
 \times
 70\%^{**}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{cubic} \\
 \text{Expected diversion}
 \end{array}$$

$$\begin{array}{r}
 \text{_____} \\
 \text{cubic yards} \\
 \text{Expected diversion}
 \end{array}
 \div
 \begin{array}{r}
 \text{_____} \\
 \text{Total volume of all waste disposed}
 \end{array}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{cubic} \\
 \text{Percent of Waste} \\
 \text{Stream Diverted}
 \end{array}$$

## By Weight

Use this formula if you calculated weight in the waste sort and if your hauler will provide weight slips for your dumpster.

$$\begin{array}{r}
 \text{_____} \\
 \text{pounds} \\
 \text{Pounds of material} \\
 \text{Discarded per year} \\
 \text{(Worksheet B)}
 \end{array}
 \times
 70\%^{**}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{pounds} \\
 \text{Expected diversion}
 \end{array}$$

$$\begin{array}{r}
 \text{_____} \\
 \text{pounds} \\
 \text{Expected diversion}
 \end{array}
 \div
 \begin{array}{r}
 \text{_____} \\
 \text{Total volume of waste disposed} \\
 \text{(provided by hauler)}
 \end{array}
 =
 \begin{array}{r}
 \text{_____} \\
 \text{Percent of Waste Stream} \\
 \text{to be Diverted}
 \end{array}$$

\*\*To be conservative, assume that you will divert 70% of the target material.

Depending upon the amount of material diverted from the waste stream, a business may be able to save money by reducing the number of times per week the dumpster is hauled or by reducing the size of the dumpster. Businesses should be encouraged to ask their waste hauler how much disposal costs can be reduced if the waste stream is reduced by the percent estimated above.