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Establishing Successful Recycling Programs in Multi-family Developments

by

Daniel Weinstein and Steve Sizemore
University of Louisville

Center for Environmental Policy and Management

Environmental Finance Center: Serving EPA Region 4

University of Louisville
Department of Sociology
Louisville, KY 40292
502-852-4749
http://louisville.edu/cepm

UNIVERSITY OF LOUISVILLE
CENTER FOR ENVIRONMENTAL POLICY & MANAGEMENT

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Introduction

The United States has seen a steady increase in municipal solid waste (MSW) production over the last few decades. Similarly, there has also been an increase in recycling rates over the same period, though it has not kept pace with waste production. As recycling programs become increasingly common and more accessible for many residents throughout the country, the most recent data available on waste generation in the U.S. show that Americans recycle 1.5 pounds out of the 4.4 pounds of waste they generate daily (U.S. Environmental Protection Agency [EPA] 2012).

Since 1980, overall U.S. recycling rates have increased from 10 percent to 34 percent (EPA 2015). However, in the last few years, rates have plateaued compared to the gains made during the 1990s and 2000s. For municipal solid waste providers, this is important to understand, particularly considering all the potential benefits gained from recycling beyond just reducing household waste. The EPA has calculated that MSW provides reduction of more than 186 million tons of carbon dioxide per year equivalent to annual greenhouse gas (GHG) from over 39 million cars (EPA 2015). Economically, various past studies have demonstrated that recycling generated significant job creation while diverting solid waste from the landfill.

In cities nationwide, the majority of municipal recycling programs tend to service curbside to only single family households. Often, multi-family housing properties are not provided the same options. Even where there is an option, recycling rates for apartment dwellers tend to be low. Trends such as greater levels of consumer product waste and increasing supply of multi-family housing starts within our cities, it becomes critical for municipalities to understand the importance of promoting greater recycling programs, including programs that include multi-family dwellings (MFD).

Establishing successful recycling programs for MFDs has its challenges. These recycling programs manifest themselves quite differently than residential recycling programs for single-family properties. This reflects differing issues of municipal program efficacy and efficiency, including the lower participation rates relative to single-family properties. In addition, in general multi-family residential waste tends to represent a fairly small fraction of the waste stream. Despite the perception that they are not being served, recycling service is offered at approximately 82 percent of multi-family developments nationwide. In two-thirds of these areas, all multi-family units are covered (Stopwaste.org 2008).

This practice guide and collection of tips is focused to inform those municipalities initiating new programs or seeking to improve existing efforts for multi-family dwelling recycling programs. This guide also addresses some of the issues faced when implementing a recycling program in MFDs and offers suggestions on how to overcome these obstacles. In addition to the links and references to the various published resources, the guide provides a small sample of municipal case studies to offer insight into how different municipalities confront their challenges to implement recycling programs for multi-family dwelling sites.

Multi-family Development Recycling Programs: Fundamental Elements

The rise in the demand and need for recycling programs in MFDs falls in the shadows of major housing market shifts occurring over the last decade demanding this type of housing development. Multi-family residential development consists of multiple separate housing units for residents contained within one building or several buildings within one complex. Often referred to as apartments, they can also take the other forms such as condominiums, semi-detached units, duplexes, townhouses, co-housing, or other forms with multiple units. Following the housing market crash of 2007, there has been an increase in demand and construction for multi-family development (Joint Center for Housing Studies of Harvard University 2015). As the demand has increased for this form of housing around the nation, so too does the need for consistent and effective programs for MFD recycling.

There are several factors that differentiate MFD recycling from that of single-family housing. A 2001 EPA study on multi-family recycling[1] presented findings from a nationwide survey that provides a glimpse at these factors and recognized four characteristics that define these programs, including

- organizational service arrangement;
- setout practices and container types;
- collection frequency; and
- commodities collected.

First, municipalities often provide MFD recycling service directly by municipality employees, but more frequently, private firms are contracted or franchised to collect the recycled materials on MFD sites. In some circumstances, private service is provided by subscription to customers. In the provision of private service, municipalities often play an intermediary role in granting franchise opportunities for the private operator and communication toolkits to encourage greater participation.

Second, whereas single-family residential recycling programs focus on curbside pickup, multi-family recycling often is collected in more areas of common use at the site. The type of containers used to dispose of the recyclable waste may differ from community to community as well as how households tote their recyclable items to the collection sites. According to the results from 40 selected sample communities from EPA's 2001 study, multi-family households typically were not provided with individual containers for their recyclables. Instead, sets of containers were often shared amongst households (EPA 2001).

Next, since residents in multi-family dwelling sites tend to share common space for collecting their recyclable waste, space allocated inside the individual units for storage is limited. Depending on the size of the site, MFD sites may collect recyclables more frequently in multi-family dwellings than for single family households. Finally, not all municipalities collect the same type of commodities (recyclable items). This varies among communities, but one factor is consistent in determining program success for diversion rates: the more items a service accepts for collection, the greater the diversion rates (EPA 2001).

Whether a service is provided directly by the municipality or through a private hauler, these aforementioned four characteristics should be considered as part of the MSW program to assure successful diversion rates. No matter the type of service or what materials are collected, whether the service is convenient and available on-site to households also becomes a significant factor. The next

[1] *Multifamily Recycling: A National Study* https://www3.epa.gov/epawaste/nonhaz/municipal/pubs/multifamily.pdf

section focuses on the elements to consider for on-site design and management of a MFD recycling service.

Implementing and Improving On-Site Efficiency and Participation

The success of any program depends largely on the ease of access for individual households, whether single-family or multi-family residential buildings. For multi-family dwelling sites, the most critical factors for success become a matter of where, how, what, and when to support effective on-site management. The easier it is to understand the program, the more successful it becomes to encourage household participation. Most multi-family residential facilities include some form of property management and residential association to oversee the operations of the site. In addition to property maintenance, safety, and security, waste management matters to maintaining residential satisfaction. Like conventional waste collection, it must be clear on these sites how to dispose of the recyclable goods as well. There must also be careful consideration where to position the collection bins as well. Considering the following items that can ensure buy-in from MFD staff and residents to generate higher participation and diversion rates:

- Establishing resident buy-in
- Contracting with a collector
- Signage
- Suggested container size and placement strategies

Establishing Resident Buy-in

Since apartments tend to have frequent turnover rates, developing consistent practices requires clear operating procedures. These specific on-site procedures will need to be developed and managed by a dedicated maintenance function with participation and assistance from a devoted program leader. This individual or group of individuals can play a role of encouragement, engaging, motivating, and supporting other residents to participate in the recycling program. Through a variety of communication methods, leaders and staff can help spread messages and information about the program, gain feedback, and monitor the overall effectiveness of the program.

One of the most consistent elements of successful MFD recycling programs is educating residents and MFD managerial staff about both the environmental and personal benefits of a comprehensive recycling program. This education ensures community buy-in and results in higher participation rates among residents. However, commitment from the property owner/manager is essential. Local governments may provide training sessions for multi-family recycling organizers in many areas. It is advisable to use as many different forms of communication as possible several times per year, especially at the time of new move-in residents. To facilitate this, recycling information and requirements may be included in the lease agreement (see Appendix B for example language of such an agreement). The nature of the audience should also be considered: materials should also be available in the languages of tenant populations at particular MFDs (Gamba and Oskamp 1993; Katsev et al. 1993).

By utilizing a variety of outreach methods, program managers can be sure their message is communicated effectively to a large number of residents. Additional outreach opportunities include:

- Meetings
- Training sessions with small groups
- Newsletters, brochures, fliers
- Door hangers
- Door-to-door outreach

- Surveys (to understand concerns or increase participation rates)
- Email lists
- Web presence
- Establish occupant volunteers as information sources
- Posters

Important outreach themes might include directions such as

- why recycling benefits individuals, communities, and the planet;
- which materials are accepted and not accepted;
- how to prepare recyclables;
- where receptacles are located; and
- whom to contact with questions.

Other ideas to encourage greater participation include the consideration by property leaders to incentivize recycling and/or adopting the role of resident advocate. They can create a friendly competition by highlighting and thanking resident advocates and others who participate in ways beyond recycling their own waste.

Contracting with a Collector

If a residential site has no option from the municipality, they must chooses to subscribe to a private hauler to provide their recycling service for multi-family residential site recycling. With this arraignment, municipalities still play a role and incentive to encourage residential participation in order to meet their own waste diversion or recycling rates. Therefore, they can work with the private haulers to challenge them to increase participation. Municipalities can make the program mandatory for residential complexes (not households) through various methods. The City of Seattle used financial incentives with their contracts to private haulers to increase participation rates above 70 percent or face fines (City of Seattle 2009). In this manner, the haulers can determine how to best operate. In turn, the municipality has the role of providing guidance on best practices and tools to facilitate positive results. Most importantly, the hauler will play a critical role in providing data to the city through the process. Being clear about what materials to be collected and communicating all expectations related to the community's goals will assist in effective collaboration between private haulers, participants, and the municipality.

Signage

Clear and visible signage should be used to indicate containers are for recycling only as well as list the materials that are acceptable. Educational materials need to be posted in common areas (laundry, mail rooms, lobbies, and leasing offices). As part of the contract working with private haulers, municipalities can ask if they could make educational posters available for the complex. Local landfills, recycling centers, and some government agencies may also provide educational materials. These materials should also be considered for placement and download from the municipality's website or partnering organization to encourage wider dissemination of the communication materials.

Suggested Container Size and Placement Strategies

Evidence from national and regional studies have demonstrated that residents are willing to recycle when it is convenient and does not present a nuisance to their way of life. The 2001 EPA study found that the most successful MFD housing units (with 20 percent or higher diversion rates) "tended to have large and numerous containers provided by the recycling service.

For once-a-week collection (the norm), a reasonable rule of thumb is to provide ¼ cubic yard (y^3) 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 y^3 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 percent to 35 percent 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. Waste haulers may be able to assist in determining the size and number of external containers as well as level of service (EPA 2001).

Local government planning agencies might want to provide input in determining the best location for containers. Typically, containers are placed as close as possible to garbage containers to increase the convenience to occupants. This area should be easily accessible. In complexes with underground parking, storing bins underground is not recommended unless ceilings are 20 ft. or higher in order to provide clearance. In complexes with exterior parking lots, the typical practice is to provide walled enclosures that contain bins and carts. These are more attractive and help confine discards to a specific area. From the residents' perspective, trash enclosures should not be right below a window, but should be within a reasonable walking distance from their door. Many cities have specific, highly detailed enclosure ordinances that govern size, appearance, access, durability, and other factors.

In addition to the overall site design and container factors, for sites with central collection locations, careful consideration should be given to the individual unit. Occupants should be provided with an in-unit container (toter) that can but used to carry recyclable goods to the central collection site. If this is not feasible, it is recommended that property management informs occupants of various ways recyclables can be stored inside the residential unit (bins, cloth bags, boxes, laundry nets, and so on). In an Urbana, Illinois, study, it was determined that MFD "recycling rates are higher in households that report having adequate interior space available for sorting and storing recyclables" (Ando and Gosselin 2005).

If it is determined that structural alterations need to be made to the property to accommodate recycling containers, recycling areas, or recycling enclosures, it is advisable to consult with local Planning departments to learn about applicable local building or zoning codes. This issue may also arise if parking spaces on a property need to be reduced in order to provide adequate space.

Municipal Best Practices

In Mecklenburg County, North Carolina, multi-family recycling in apartment complexes is "hit 'n miss" (N. Crawford, Senior Environmental Specialist, and D. Harris, Environmental Supervisor, Mecklenburg County (NC) Solid Waste, personal communication, September 5, 2014). Both Crawford and Harris acknowledged that it is "tough to get buy in" from apartment managers and owners but the county is determined to bring more apartment complexes into the recycling program.

One of the biggest obstacles they have found in getting property managers and owners to set up a recycling program for apartment dwellers is the low tipping fee for trash at the local landfill. The tipping fee for residential trash is $27.50/ton; an estimated cost for commercial businesses is $40-$50/ton. North Carolina does have a statewide law that prohibits the dumping of certain recyclable items (such as aluminum cans and plastic bottles) in landfills, but there is little if any enforcement.

Crawford and Harris have employed several strategies to market the county's multi-family recycling program. Crawford noted that property owner and property manager buy in is necessary to set up a program. But getting the property managers to work with the county to do this is even more difficult if the apartment complex is owned by a large national real estate development company. Crawford's strategy is to start with some of the most senior decision and policy makers; he first approaches the regional manager of the facilities and get a commitment to set up a recycling program at the company's apartment complexes located in Mecklenburg County. Once the directive is given from the regional director to set up a multi-family program, the local property managers comply.

Once a program is established, residents must understand commit to recycling efforts. For example, in Louisville, KY, Sheppard Square, a Louisville Metro Housing Authority (LMHA) HOPE VI Revitalization project, mandates that its residents actively participate in both its recycling and composting programs. Announcements and information regarding recycling are included in the residents' newsletters. Information about the mandatory recycling procedures and processes are contained in Sheppard Square's Enterprise Green Communities Residents Manual. This manual is distributed to each household and referenced in an addendum to the renter's lease agreement with LMHA.

In addition, activities have been organized to educate and motivate residents about recycling. These include:

- A June 2014, LMHA-sponsored Sheppard's Square block party which included recycling-themed games, door prizes, and free recycling tote bags. Children's activities were included since parents often follow the lead of their children when incorporating recycling practices in the home.
- A tenant appreciation day that included gifts such as reusable containers, lunch boxes, dishes, dish towels, dish rags, local food, and snacks.
- A training program about single-stream recycling at a nearby school for residents and school staff; translators were on hand for Somalian residents who did not speak English.
- A dumpster corral that was architecturally designed for the HOPE VI housing project with recycling bins located along a brick wall near the garbage/trash bins.

Other ways to motivate residents include recruiting resident advocates to reach out to other residents and offering incentives to both advocates and residents who participate in recycling and encourage others to do the same. Another way to reward residents of MFDs with successful programs is to provide recycling credits on bills for other municipal services, such as municipal water or electric service. While such a system could not reward tenants based on their individual recycling efforts, tenants would receive a savings related directly to the building's recycling progress. The potential for further rate reductions may increase peer pressure on non-recyclers to participate.

Elements of Successful Municipal Multi-family Recycling Policies

As discussed in the previous section, much of the success for improving recycling rates in MFD depends on cooperation and programs implemented on a site-by-site basis. However, municipalities, and in particular solid waste divisions, must understand why it is important to develop a complete program for residential recycling. As this guide emphasizes, this also includes the often excluded multi-family residential sites.

If a local government desires to increase recycling rates and reduce landfill waste, one of the key action steps a local government can take is to adopt a waste management plan. Within this plan, various

factors for meeting this goal should be articulated. The plan should identify the community's greatest sources of waste, set formal waste reduction targets, and establishes actions to help reach the community's waste reduction aims. In addition, the plan can include other elements such as

- identification of performance measures, focused on participation and diversion rates;
- public education materials, including the directive to establish a website and transferable materials;
- incentives and mandates to increase participation by MFD complexes and private haulers;
- identification of related building and land development code provisions affecting recycling in MFD sites; and
- evaluation guidelines.

There are common characteristics of successful multi-family recycling policies which may serve as a guide to readers or others considering such a policy for their own locality. Successful programs do most or all of the following:

- Utilize single-stream recycling in order to maximize efficiency and minimize amounts of non-recyclable waste in the recycling process.
- Mandate recycling by local ordinance, including the creation of penalties for non-abiding owners/managers and reoccurring audits to ensure compliance.
- Mandate the use and provision of totes in most cases or other containers where space is more constrained.
- For high-rise buildings, locate recycling collection near each floor's trash room or in a cart which is easily transportable to the collection area.
- Mandate that new buildings include a "recycling chute" along with traditional garbage chutes.
- Mandate notices on every floor of a MFD which explain the local recycling program, including acceptable and non-acceptable items and how to participate. These notices should be produced in multiple languages as applicable.
- Conduct periodic audits to track progress towards diversion rate goals, inspect sites and properties participating in MFD recycling to observe the extent of compliance.
- Provide up-to-date websites with comprehensive information on both the use and effectiveness of the local recycling program.
- Reward residents of MFDs with successful programs by providing recycling credits on bills for other municipal services, such as municipal water or electric service. While such a system could not reward tenants based on their individual recycling efforts, tenants would receive a savings related directly to the building's recycling progress. The potential for further rate reductions may increase peer pressure on non-recyclers to participate (De Young et al. 1995).

Municipality Policy Best Practices

All cities struggle with their recycling programs in general and with documenting the percentage of waste that is actually recycled. Implementing MFD recycling ordinances and policies that require owners to provide recycling options is one path localities have chosen. The following examples from Chicago, Boston, and Charlotte demonstrate some of the challenges and insight to actions taken by the cities to encourage greater site and residential participation and overall recycling rate increases for the cities.

Chicago, Illinois

Approximately 75 percent of the City of Chicago's housing stock is multi-family residential properties.[2] With city estimates considering that at least 50 percent more garbage is produced by its multi-family residents than do their low-density neighbors, it becomes imperative for the city to more effectively address multi-family recycling programs. Efforts to increase recycling rates came following the City of Chicago's 1993's passage of the *Chicago High Density Residential and Commercial Source Reduction and Recycling Ordinance* which requires owners of high-density units to provide residents with access to recycling programs. The ordinance specifically defines high-density buildings as having more than four residential units and receiving waste collection service from a private hauler. Furthermore, the ordinance includes a couple of key provisions, including promotion of what is accepted as recyclable and the establishment of a target recycling rate. By 1996, the City had hoped to achieve a 12 percent multi-family residential recycling rate. In order to achieve that, each building must have a recycling plan which lists what items on the City's master list of recyclables will be collected.[3] In addition, each buildings' recycling program must include at least two recyclable materials and provide at least two "source reduction measures." The latter include solutions such as energy-efficient light-bulbs, mulching lawn mowers, yard composting, reusable bags, and providing educational materials about reducing consumer waste.

The most comprehensive evaluation of Chicago's multi-family recycling policies, conducted by the city through an EPA-funded project study in 2009, demonstrated them to be effective. The evaluation found an overall increase in recycling rates across their sample from 4 percent to 11 percent, with some buildings showing increased recycling rates as much as six times higher than pre-implementation recycling rates (Schwebel 2012). Nevertheless, they failed to achieve the targeted rate. It is important to note that improvements across the sample varied significantly – while some buildings improved significantly as mentioned above, others barely improved or didn't improve their recycling rates at all. A more detailed examination of each building suggests the differences in recycling rates are due to differences in the quality of implementation in each building. It would appear that building managers which engaged the program seriously were able to achieve positive results (City of Chicago Department of the Environment 2009).

The lessons learned from the Chicago study one of the key factors of Chicago's future success in increasing MFD recycling would be to ensure effective 'prompting' or communication about the city's resources and practices for recycling. As demonstrated in the 2009 study (Schwebel 2012), following a baseline assessment, the city updated a toolkit and education materials and followed up with a subsequent audit to evaluate whether new approaches would result in positive outcomes. In many of the case study buildings, the results were positive. Most importantly, the lesson learned from the Chicago study was the opportunity it provided for the city to evaluate the strengths and weaknesses of its MFD recycling program.

Boston, Massachusetts

The City of Boston established its recycling policies in 1990 with the passage of its first recycling ordinance. A 2002 addendum specified a mandate for recycling within "large residential buildings with

[2] Housing Studies. 2012. "The Composition of Cook County's Housing Stock." August, Accessed March 11, 2016. http://www.housingstudies.org/media/filer_public/2012/08/29/ihs_data_brief_housing_stock.pdf.

[3] See the City of Chicago's "Resources and Frequently Asked Questions for Multi-Unit Recycling" (http://www.cityofchicago.org/city/en/depts/streets/supp_info/recycling1/resources_and_frequentlyaskedquestionsformulti-unitrecycling.html).

more than six units" (City of Boston Municipal Code 2008). These requirements were goals developed in the *Massachusetts Solid Waste Master Plan* of 1990, and updated in the Commonwealth's *Beyond 2000 Solid Waste Master Plan*, which sets minimum requirements for all municipalities within the State (Massachusetts Department of Environmental Protection [MassDEP] 2000). A December 2000 Memorandum by the Massachusetts Executive Office of Environmental Affairs states that one of the 'key new initiatives' in the 2000 Plan includes "pursuing multi-family residential recycling legislation to ensure access" (MassDEP 2000).

In pursuit of these mandates, the City of Boston established a target rate for residential recycling at 19 percent and regularly reports its progress to meet that through its "Boston About Results" progress management reporting system.[4] While the rate fluctuates by quarter, upon moving to a single stream recycling system, the City witnessed a 68 percent increase in recycling rates between 2008 and 2012 and an overall 11 percent diversion of waste to the landfill (Moran 2013). The City code additionally stipulates the reporting requirements which include annual rates of participation and volume by district (City of Boston Municipal Code 2008). In 2002, MFD buildings in Boston were specifically included within Boston's Recycling Program (City of Boston Municipal Code 2008). Under this code, it is not until a MFD resident requests that recycling be established within a certain building that an owner has 30 days to comply by providing access to the City's recycling services. At this point, the building owner or management is obligated to installing and maintaining recycling carts in common areas as close to trash dumpsters as possible. Collection of materials often occurs via recycling carts, typically 30-90 gallon plastic or metal containers, "clearly marked and/or identifiable as a container for recyclables" (City of Boston Municipal Code 2008). In the event that implementation of a recycling collection area is not possible, then the owner of the building must provide specific evidence to request exemption (City of Boston Municipal Code 2008).

In Boston, owners of buildings containing seven or more units are required to provide recycling. Data reporting for each MFD is limited to the tonnage of recycled materials collected. Boston's Public Works Department contracts haulers to collect recyclables from MFD units instead of building owners independently hiring haulers. By doing this, it permits the City to collect more accurate data, making it unique for MFD programs nationwide. Boston's Annual Reports do not clearly indicate whether the MFD buildings that had tenant requests for recycling reflect all MFD dwellings that would be appropriate for inclusion under the code. Therefore, since not all MFD buildings are included in assessments, it is potentially misleading to assume that the actual success rate reflects any potential recycling rates (Schwebel 2012). Nevertheless, Boston has improved their recycling rates by enforcing the existing ordinance and facilitating participation streamlining the user experience. For building owners, the city provides violation notices of incompliance with the existing ordinance thus serving to enforce action. For individual households, in the attempt to expand greater participation from Boston's high density, compact residential buildings, in 2012 the city began to allow the use of clear plastic bags to mitigate storage limitations. (Schwebel 2012). According to reported performance measures through the City's Boston About Results web portal, the city continues to meet its targeted 19 percent recycling rate. Further evaluation of multi-family residential units is needed to determine whether the process and enforcement measures have contributed to the continued improvement.

Charlotte, North Carolina

The City of Charlotte provides the option for hauling recyclables at multi-family units; however, not every multi-family complex contracts with the city for its trash haulers. Of the 750 multi-family

[4] Boston About Results Per http://www.cityofboston.gov/bar/scorecard/reader.html

properties served by the City, 70 percent have recyclables pick-up (M. Gant, personal communication, August, 22, 2014). For those properties with 30 units or more, this translates to more than 110,000 residential units (Israel 2014). In total, multi-family recycling represents 5 percent of the total amount of recyclable materials hauled in by the City which equates to about 4,300 tons/year.

There is no mandate to have recycle pick-up at multi-family properties, however, there is an ordinance (Zoning, Chapter 12, Part 4, Section 12.403), that states that all new properties with 30 or more residential units (new defined as being permitted after October 17, 2001) MUST provide space for recycle bins/recycling centers; the number of spaces required is based on the number of units in the development. There are exceptions for multi-family properties that pre-date October 17, 2001; these developments may have the number of required spaces reduced due to existing conditions (City of Charlotte, Code of Ordinances).

The City has opted to use 95- or 96-gallon rollout carts that are grouped in designated areas/stations. A recycling station typically holds one to five rollouts and measures 144 square feet; stations can be placed throughout the complex to accommodate the residents (Israel, 2014; City of Charlotte, Code of Ordinances). The City does not provide individual residential recycling containers; residents are responsible for their personal recycling bins (M. Gant, personal communication, August, 22, 2014).

Like many cities, promotional materials for residents are provided by the City and can be obtained by request from the property owners/managers/recycling coordinators as well through a link to a recycling brochure at the city's website. Challenges cited by multi-family residents is the amount of space (or lack thereof) inside the residential unit to accumulate recyclables and that residents must carry two separate bags (one for trash and one for recyclables) to bins (M. Gant, personal communication, August, 22, 2014).

Other Consideration for Municipalities

Mixed Use Developments

These developments may have retail and/or office space on the ground floor and several stories of residences above, with frontage on a commercial street and parking behind (or, sometimes, in an underground garage). Businesses' needs for garbage and recycling space depend on the types of activities they are engaged in. Note that garbage compactors can hinder recycling by taking up space and preventing the monitoring of discarded materials. There may be opportunities for residents to make use of recycling amenities installed for businesses. For example, if the businesses use a cardboard baler and have a cage where cardboard is accumulated, residents may add their cardboard to the cage if they have access. Or, if food outlets use a special container for food waste recycling, it could be upsized to handle food waste from residents as well. Even the smallest cafes can generate significant quantities of food waste – coffee shops and juice bars in particular – so it could be well worth planning for food waste collection to serve both the building's commercial and residential occupants.

Fire Codes

Site designs are determined by building and land development code requirements. As a component of those codes, safety from fire risk is fundamental, particularly for building code issues. This section includes a brief overview of on-site collection of recyclable items.

Internal Storage

- Internal storage of recycling containers may conflict with fire safety codes.

- Recycling bins are typically not allowed to be stored in hallways.
- Containers may not obstruct exits and, generally, must leave a minimum of 2 feet of clearance between the top of the container and the ceiling.
- Rooms used for inside storage must have an approved one-hour fire-rated sprinkler, an automatic sprinkler system, and a 20-minute self-closing fire door with a latch.
- Equipment rooms, attics, and similar spaces cannot be used for combustible storage.
- Do not provide indoor communal bins unless in an area already with sprinkler coverage, such as a laundry room.
- Provide individual units with a small recycling bin designed for in-unit storage.

External Storage

- Dumpsters and other metal containers must have tight-fitting lids and be stored at least 5 feet away from combustible walls, openings, or roofs.

Financing

Savings from Recycling in Multi-family Developments

In most communities, MFD solid waste service costs are based on container size and collection frequency. Many haulers (both public and private) collect recyclables and/or yard debris at a lower cost than collection and disposal of an equal volume of trash. Other haulers provide recycling and yard debris collection to their trash customers at no additional cost. According to a nationwide survey conducted by the EPA, multi-family recycling costs, on average, are $20.50 per household per year. Single-family recycling tends to be more expensive, averaging $28.76/household annually (EPA 2001). In many cases, MFD management will see little cost increase when adding recycling service because recycling pick-up is often cheaper than trash pick-up; in addition, savings may be found when waste containers can be downsized and collected less frequently as is the case when recyclable diversion rates are substantial.

EPA evaluations of MFD recycling provide some insight. San Jose, CA, charges MFDs for trash service and provides recycling and yard debris collection at no additional cost. One San Jose area MFD complex, Blossom Hill Estates, avoided almost $60,000 in trash disposal fees in 1997 through recycling and composting. In many cases, the community or hauler provides collection carts and bins. Apartment management can often reduce their total solid waste management costs if residents recycle enough to reduce needed trash container size or collection frequency. The Commodore Club in Key Biscayne, FL, reduced trash collection and disposal costs after implementing its recycling program. Building management saves approximately $1,600 per year on waste management costs (California Integrated Waste Management Board 2001).

Most weeks of the year, buildings tend to generate the same amount of refuse in total, and collection rates are based on bin types and sizes. It is important for buildings to match the volume of service to the volume generated and not oversubscribe to service. Remember that diversion discount: by recycling and composting everything that can be recycled and composted, buildings can reduce the number and size of their trash containers, a key to managing disposal costs.

"Pay-as-you-throw" Policies in Multi-family Settings

Pay-as-you-throw (PAYT) policies represent a policy model where users are charged by local authorities for the waste they generate for collection. The most recent data available show that there are over 7,100 communities in the U.S. using some form of PAYT, accounting for just over 26 percent of all U.S. communities and over 25 percent of the U.S. population as of 2006 (Skumatz and Freeman 2006). There

are three different kinds of pricing models: full-unit, where a container is purchased in advance of waste collection; partial-unit, where a regulation is created to allow for a maximum number of trash containers, with fees attached to the use of additional containers over the maximum amount; and finally, variable-unit pricing, where containers of various sizes are rentable and users pay a rate corresponding to their waste generation level. Variable-unit pricing is an attractive option in situations where hauling contracts, fees, or rates are up for renewal; in situations where the landfill is deemed too expensive; where there is a perceived need for more recycling; where the recycling system itself is seen as unfair; and finally, if the jurisdiction is running out of tax authority (Skumatz 1990).

The logic behind such policies is based on two common principles for environmental policies: the polluter pays principle and the idea of shared responsibility. Under PAYT schemes, waste management services can be treated like other utilities. Such schemes also encourage a more deliberate and thorough separation of recyclable material and waste material, which often results in an overall reduction in energy used for transporting waste, an overall reduction in pollution from landfills and incinerators, and higher levels of potentially recyclable material being recycled instead of reaching a landfill (Miranda et al. 1996). The main downside to PAYT policies is that, in some cases, it may incentivize illegal dumping (Fullerton and Kinnaman 1994).

Implementation of PAYT schemes is more difficult in the multi-family housing setting, largely due to common sources of waste collection such as garbage chutes and dumpsters making individual waste production difficult to gauge. While multi-family residences pose particular challenges for variable rate programs due to the co-mingling of wastes in common trash receptacles, there are some limited solutions to these problems. Skumatz has suggested that bag or tag systems can be used, or the landlord subscribes to the service for the building as a whole (Skumatz 1990). The lack of a one-to-one relationship between the "curbside" and each household makes it difficult to monitor individual household behavior. In addition, high-rise buildings typically have a single trash chute, which makes separation of wastes complicated. Storing separated wastes on each floor of the building increases the incidence of pests and raises labor costs (Bauer and Miranda 1996).

Variable rates

Variable rate programs have proven quite workable in smaller-scale multi-family dwellings, such as garden apartments and townhouses. Now that technology has been developed for high-rise apartments that allows tenants to direct a disposal chute electronically into six different bins, newer multi-story buildings can be designed to facilitate variable rate programs and recycling. Pilot studies found that tenants favored the convenience of this electronic disposal method and as a result recycling increased significantly and promised a payback period of three years (Skumatz and Green 1999).

Variable rate programs can be tailored to the particular waste profile of particular communities. Studies of San Francisco's waste stream revealed that food waste comprised a particularly large percentage of the city's mixed refuse after the implementation of variable rates in conjunction with curbside collection of recyclables and yard waste (California Integrated Waste Management Board 2002). After experimenting with a variety of separation options for food remnants, the city developed the "Fantastic Three" program. Households received three carts at no charge (wheeled receptacles): a blue 32-gallon cart for recyclables (paper, bottle, and cans), a 32-gallon green cart for compostable waste (yard remnants, food waste, and soiled paper), and a variable rate black cart, ranging from 20-64 gallons in size, for all other refuse. The City also provided households with a 2-gallon kitchen container for collecting food waste. Targeted neighborhoods achieved 46 percent diversion rate (14 percent for organics and 32 percent for recyclables), a 90 percent increase over prior experience of recycling and

trash collection in that neighborhood. Nearly two-thirds of the increase is attributed to the compostable collection effort and approximately three-fourths of those surveyed preferred the approach to recycling over previous approaches.

Buildings tend to generate the same amount of refuse in total, and collection rates are based on bin types and sizes. It is important for buildings to match the volume of service to the volume generated and not oversubscribe to service. Remember that diversion discount: by recycling and composting everything that can be recycled and composted, buildings can reduce the number and size of their trash containers, a key to managing disposal costs. Another great way for apartment complexes to reduce costs is to roll their bins to the curb on collection day. That eliminates distance and elevation costs, which can add up, especially if a building has a lot of inside bins. The bins typically have handles and wheels, so in most cases an onsite manager or other able-bodied person can wheel them to the curb.

Conclusion

Housing market demands for multi-family dwelling sites has increased in recent years. As emphasized within this practice guide, if cities are to achieve greater recycling rates, these sites should be a critical focus of any municipal waste reduction strategy. As residential recycling rates have plateaued in recent years, looking for new opportunities for improvement leads to multi-family dwelling sites as an obvious focus. MFD sites will also play a factor as communities are faced with the need to divert waste from landfills in order to avoid reaching land capacity. In addition, recycling makes good environmental policy as it helps reduce greenhouse gas emissions and prohibits recyclable waste from interfering in ecological processes, such as bird and fish habitats.

As shown throughout this guide, implementing MFD recycling at the local level has its challenges and its benefits. Municipal solid waste divisions play a critical coordinating role between public or private haulers, MFD sites, and the general public about the importance of increasing participation and diversion rates. Educating both staff and residents can ensure buy-in and full participation rates which leads to economic and environmental benefits for everyone. As recycling becomes more common, and even mandated in some jurisdictions, options for dealing with waste becomes even more accessible. Creating the right program for any development is essential to the program's success. While initial efforts may need to be revised, committed residents and MFD staff can work together to refine recycling programs so that high levels of participation are reached. As these programs become established and gain support, the benefits are reaped by all stakeholders.

Resources

Stopwaste.org – http://stopwaste.org
Beginning in 2002, Stopwaste.org has provided grant funding, technical assistance and resources to members. Approximately $130,000 in funding has been awarded and outreach has been conducted to over 20,000 units. The average cost for program implementation was less than $10 per unit. Based on the results, the grant program appears to be successful and cost effective.

National Recycling Coalition – http://nrcrecycles.org
The National Recycling Coalition is a non-profit organization focused on promoting and enhancing recycling in the U.S. Their network of more than 6,000 members extends across waste reduction, reuse, recycling, and composting. They also provide educational resources and webinars for related topics.

Biocycle Magazine – http://www.biocycle.net
Published since the 1960s, Biocycle presents up-to-date information on processing remains of organic products into value-added products, including compost, fertilizer, biogas-derived electricity, and vehicle fuels. This magazine, while not squarely aimed at MFD recycling, offers solutions for promoting sustainability that MFD residents and others may wish to adopt.

Select Municipal and State Multi-family Recycling Programs and Guides
Cities, counties, and states throughout the U.S. have implemented recycling programs for residents of multi-family residential complexes. Many of these program guidelines and regulations can be found online on municipal and state websites. Below is a sampling of what is available:

Boston, MA
http://www.cityofboston.gov/publicworks/wastereduction/recycling.asp

Chicago, IL
http://www.cityofchicago.org/city/en/depts/streets/supp_info/recycling1/recycling_multi-unitresidentialbuildings.html

Denver, CO
www.denvergov.org/DenverRecycles

Florida: Mandatory Multi-family Recycling
http://www.hollywoodfl.org/index.aspx?NID=757

Georgia
www.georgiarecycles.org/environmental-education/citizen-resource-guides/ and Building Multi-family Recycling Programs in Georgia
http://www.dca.ga.gov/development/EnvironmentalManagement/programs/downloads/MultiFamRecycle2010.pdf

Madison, WI
www.cityofmadison.com/streets/

Marion County, OR
www.co.marion.or.us/PW/ES/wastereduction/multi-family/index.htm

Hennepin County, MN
http://www.hennepin.us/business/recycling-hazardous-waste/apartment-recycling

New York, NY
www.nyc.gov/recycle

Palo Alto, CA
www.cityofpaloalto.org/gov/depts/pwd/zerowaste/thingstodo/mfdtoolkit.asp

Phoenix, AZ
www.phoenix.gov/menu/resutilgarbrec.html

San Antonio, TX
www.sanantonio.gov/swmd

San José, CA
www.sjrecycles.org/

Tennessee
Boosting Recycling in Tennessee
https://www.serdc.org/Resources/Documents/Boosting%20Recycling%20in%20Tennessee%20Workbook.pdf

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Appendices

Appendix A: Sample Talking Points for Door-to-Door Outreach Volunteers

Adapted from www.rethinkrecycling.com;
www.uos.harvard.edu/fmo/recycling/myths.shtml; and
http://www.hennepin.us/~/media/hennepinus/residents/recycling/

Goals of door knocking

- Raising awareness about the new recycling program in this complex.
- Educating residents on how to recycle.
- Gathering support and commitment from residents to recycle.

Tips

- Smile!
- Let residents know you are volunteering to help other residents learn about the recycling program. You aren't a salesperson, and it may be helpful to identify yourself as a fellow resident.
- End conversations with something friendly to avoid "sales pitch" perception.

General Points to Review with Residents

- "I'm here to let you know how you can participate in recycling and contribute to the program's success in our community."
- Review and provide educational materials.
- Ask if residents would like to become advocates themselves, and explain the role (reporting problems, educating neighbors, generally monitoring the program)

The Benefits of Recycling

- Making new products from recycled materials uses less energy and natural resources, and therefore mitigates pollution which would otherwise be generated as new products are made.
- Aluminum, steel cans, cardboard, glass bottles, paper, newspapers, and plastic bottles are all recyclable. These items can be used to make new bottles or cans, or even school buses, playground equipment, and building materials.
- Glass and aluminum do not wear out and can be recycled over and over.
- The amount of energy saved from recycling one aluminum can is enough to power a TV for three hours.

Frequently Asked Questions and Responses

- "What I throw away doesn't amount to much."
    - Explain that small amounts from each individual add up to a LOT in the big picture. Can you think of anything else you can do to help recycling in our community? Do you already recycle, for example, your junk mail? On average, Americans receive 50 pounds of junk mail a year.
- "There is already someone who takes our cans for recycling."
    - More than aluminum can be recycled (go over materials accepted and how to prepare them).
- "We have plenty of landfills and recycling isn't important."

    - Recycling's value comes from preventing pollution and conserving resources and energy, not conserving landfill space.
- "It's someone else's job to separate recyclables from trash, so I don't need to do it."
    - Labor requirements for sorting recyclables from trash after it is mixed are very cost-prohibitive and almost never happen.
    - The only feasible way to separate recyclables is prior to throwing them away and takes minimal effort. Add a second container for recyclables next to your trash can, it's that easy.

Appendix B: Sample Lease Language to Mandate Resident Participation

This addendum serves as your required notification of the recycling program on this property.

(Instructions on how to prepare/separate items for recycling. Be clear and provide references [infographics are a good idea] to show residents how to prepare their waste for recycling pickup.)

It is the tenants' responsibility to participate in the recycling program. You are required to prepare your recycling as covered in the attached recycling guide. Failure to comply will be considered to be a material violation of this rental agreement and local and state law, which could result in termination of your tenancy as permitted by law.

Recycling bins are located on this property at:

_____

_____

Recycling bins are emptied on:

_____

_____

_____ _____

Tenant's Signature Date