Toting an Idea:
A Practical Ideal Model for the Design and Distribution of Personal
Recycling Containers for Multi-family Dwelling (MFD) Tenants

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# Abstract

*Purpose.* The purpose of this study is to create a practical ideal model for the design and distribution of personal recycling containers for multifamily dwelling (MFD) tenants. By examining MFD recycling program infrastructures more closely, barriers to tenants' ability to recycle appear. It is suggested that providing personal recycling containers will help tenants overcome those barriers.

*Methods.* A questionnaire was employed to gather the data for this study. Judgment and snowball sampling methods were utilized to identify those in the sampling frame. Individuals in the U.S. and Canada were asked to participate and each was required to have knowledge or experience regarding the provision of personal recycling containers. Participants were ask to give their opinion regarding ideal methods of design and distribution.

*Results.* Fifty-one individuals participated and a practical ideal model was produced (see Chapter 6). Notably, personal recycling containers were found to be best method to educate and inform tenants about recycling and tote bags were found to be the best form of personal recycling containers. Furthermore, participants identified the same barriers to MFD recycling identified in the literature: transportation, storage, and space.

*Conclusion.* While this model may not always fit the contours of a specific area's MFD recycling program, it should still serve as a practical guide towards what is currently understood as ideal. The support this study exhibits for the use of recycling tote bags and the still unrefined aspects of the model warrant further research.

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# CHAPTER 1 - INTRODUCTION

Multifamily dwelling (MFD) recycling is becoming increasingly germane. With plateauing residential recycling rates, local governments have been increasingly interested in expanding recycling programs to include MFDs[1] (Ando and Gosselin 2005). Considering ten percent of the U.S. population resides in MFDs, the benefits are evident (National Multi Housing Council 2012). Furthermore, highly dense populations characterize MFDs. By expanding recycling services to just a single apartment complex, a residential neighborhood's worth of recycling could be collected.

Although the number of MFDs in the U.S. and Canada that have access to on-site recycling services is growing, the ability to use these services is not quite as convenient as one might think. In order to provide the infrastructure for MFD recycling, contracted recycling haulers often create a 'communal recycling area' towards a central location within each property. Considering MFD recycling receptacles are for the community, they must remain in the communal recycling area. Conversely, residents of the typical residential neighborhood are often given *personal* recycling receptacles to do with as they please. Thus, different from residential residents who recycle, MFD tenants who wish to recycle traditionally do not have the convenience of a personal recycling container.

Communal recycling program infrastructures at MFDs ultimately create inconveniences, or barriers to recycling. Barriers include: 1) the inability to *transport* recyclables to the communal recycling area, 2) the difficulty of obtaining a vessel to *store* recyclables in the unit, and 3) the lack of *space* in MFD units in which personal recycling containers may be stored. As well, a broader examination of MFD recycling program infrastructures reveals the similarities between different properties – communal recycling areas are universal features of MFD recycling programs (see Figure 2.1). Thus, the barriers to recycling at MFDs are universal. The appearance of universal barriers suggests that a universal solution is possible.

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[1] MFDs are often defined as apartments, apartment complexes, and multiplexes with 5+ units.

In light of the universal presence of communal recycling areas and the universal barriers this particular infrastructure creates, it is found that the provision of personal recycling containers is a universal solution to overcoming the barriers of transportation, storage, and space. Thus, the purpose of this research is to develop a practical ideal model for the design and distribution of personal recycling containers for multifamily dwelling tenants. Practical ideal models are designed with a pragmatic slant; while this study will ultimately present a definitive prescription, that prescription is organic in nature and malleable with future research (Shields and Rangarajan 2013). While it is known that some local governments in the U.S. and Canada have appended their MFD recycling programs with a personal recycling container provision component, its occurrence is rare.

The rest of this paper is structured in the following order: Chapter 2 identifies barriers to participation in MFD recycling and describes how the solution to overcome the barriers was identified; Chapter 3 presents a review of the literature regarding single family dwelling (SFD) recycling, MFD recycling, and general recycling behavior; Chapter 4 defines the methodology used in this study; Chapter 5 presents the results; Chapter 6 provides a discussion of the results; and Chapter 7 concludes this paper.

**CHAPTER 2 – BARRIERS TO PARTICIPATION IN MFD RECYCLING**

Apartment dwellers are traditionally ignored when local governments administer recycling programs. In cases where multifamily dwelling (MFD) recycling programs are administered, there remains a lack of research to properly guide them towards program success. Furthermore, in lieu of the various styles of MFDs, authors often assert that universally applicable models for MFD recycling are impossible to create (EPA 1999; Lease 2001; Olson et al. 2010; Wood 1991). Ultimately, there remains a research-policy-practice gap in regards to MFD recycling programs. This research asserts that universal models for MFD recycling are possible and aims to contribute to the MFD recycling literature.

Here, the community-based social marketing (CBSM) approach to problem solving will be used to identify a strategy for improving MFD recycling programs. CBSM instructs public administrators to look at an end user's unique contextual environment to determine what barriers inhibit their enactment of a desired behavior. From this examination a strategy should be suggested to overcome the identified barriers. When applied to the topic at hand, CBSM instructs recycling program administrators to look at MFD tenants' unique contextual environment to determine what barriers inhibit their ability to recycle.

The purpose of this chapter is to gain a better understanding of the various MFD structures in an attempt to identify barriers to participation to recycling. Barriers are identified as transportation, storage, and space. Indeed, all three barriers are found to be universal. The transportation barrier is a result of commonalities in MFD recycling program structures, the storage barrier is a result of the inability to obtain a proper recycling container, and the space barrier is a result of spatial constraints that characterize MFD units.

Subsequently, the provision of personal recycling containers to MFD tenants is identified as a universally applicable strategy to overcome all barriers. Social behavior modification tools play a role as well, improving the provision of recycling containers and increasing the chances that tenants will continue to use those containers after distribution. The behavior modification tools included in this research are prompts, social norms, and communication.

**<u>Designing Public Sustainability Programs</u>**

Inquiry into matters of public administration should adhere to a strategy when solving a problem (Shields 2008). Still further, when designing public programs to address environmental sustainability issues, public administrators should utilize a strategy in order to increase the propensity for program success.

Environmental sustainability places value on earth's natural resources and encourages us to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, cited by Oskamp 1995, 159). Environmental sustainability programs are now common in the public realm; likewise, public administrators are expected to enact these programs with success. Success in administrating environmental sustainability programs could then be had by motivating or persuading citizens to appropriately use natural resources so that future generations are not hindered in their use. Goals should be set to measure progress. Consequently, public administrators should be concerned with what strategies to utilize when responding to sustainability issues so that solutions are likely to achieve goals in light of a dynamic reality (Oskamp 1995).

Advancements in ecological knowledge since the 1960's prove the interconnectedness of earth's various environments, plants, animals, water, air, land, as well as the relationship between the health of the environment and human health (Hays 2000; Ebreo and Vining 2000). Consequently, the broader community inevitably receives most benefits from sustainable behaviors; however, sustainability ultimately rests on human behavior. As well, sustainability is not a singular decision, action, or behavior – sustainability is a habitual manifestation of any one of these items. Therefore, citizens typically need more than information in order to maintain a focus on sustainability – they need a fundamental change in behavior.

*Traditional Approaches*

The programs public administrators oversee have traditionally paid too little attention to the likelihood of actually changing citizens' behavior, and those that try underestimate the difficulty of this task (McKenzie-Mohr 2011; Kennedy 2010). This dysfunction has significant implications for sustainability programs. Conventional thought held that the provision of information would affect change (Kolter and Zaltman 1971). Information-oriented approaches are based on one of two thought processes: 1) increasing public knowledge affects attitudes, resulting in pro-social behaviors, or 2) increasing public knowledge allows the 'economic self-interest' of citizens to take over, resulting in pro-social behaviors (McKenzie-Mohr 2011). Information-oriented approaches are correlated to changes in behavior, but their relationship is either weak or nonexistent. What results is an information-driven campaign that fails to create new behavior or alter lifestyle patterns (McKenzie-Mohr 2011; Costanzo et al. 1986; Austin et al. 1993 [in reference to recycling]). Consequently, without a strategy to guide the provision of information, it is very unlikely that users will internalize new behaviors (Nixon and Saphores 2009).

Information intense strategies towards altering behavior, used alone, will not be sufficient to alter behaviors related to sustainability. Information-induced knowledge, attitudes, and self-interest would theoretically predict behavior, but externalities, specifically inconveniences, hinder their enactment. Program administrators should seek to identify these inconveniences.

*Community-Based Social Marketing*

Community-based social marketing (CBSM) provides an approach to solve public issues such as those surrounding sustainability (Kennedy 2010; McKenzie-Mohr 2011). Before suggesting solutions to specific issues, CBSM instructs public administrators to seek a more intimate knowledge of the environment where the issue arose and where solutions will be carried out (Kennedy 2010). The CBSM approach instructs researchers to 1) select a behavior to alter, 2) identify barriers to the selected behavior, 3) develop a behavior change strategy, 4) pilot and, 5) enact broad-scale implementation (McKenzie-Mohr 2011). The identification of barriers allows for more practical solutions. CBSM's steps of analysis will now be employed to identify the sustainable behavior under consideration.

## Step 1: Identify a Behavior

This section will address the first step in community-based social marketing – one should pick a behavior to promote. The following sustainable behavior is chosen: participation in multifamily dwelling recycling programs. The criteria used to classify a structure as an MFD is defined differently in every locality, but the general definition should apply to multiplexes with 5 or more units, apartments, and apartment complexes. The inclusion of fourplexes and condos varies and duplexes are typically excluded. Opposite, single-family dwellings (SFDs) are the freestanding houses one would find in a residential neighborhood. The reason for addressing recycling at multifamily dwellings is threefold. 1) Relative to SFDs, MFD recycling suffers from a research-policy-practice gap. Bridging this gap is crucial because 2) MFDs are prevalent and contribute greatly to the waste stream, and 3) MFDs record lower diversion rates than SFDs (Ando and Gosselin 2005; EPA 1999a; Olson et al. 2010). A diversion rate is the percentage of material that is collected and recycled (Lane and Wagner 2013).

CBSM's proven approach to altering human behavior makes it ideal to address recycling (Kennedy 2010; Macy and Thompson 2003). Although the CBSM approach has been applied to recycling programs before, definitive evidence of its success or failure in MFD recycling specifically is not available (Aceti Associates 2002; Folz 1991; Haldeman and Turner 2009; Folz and Hazlett 1991).

*Prevalence of MFDs, Increased Waste Generation, and SFDs vs. MFDs*

One in ten households in the U.S. are classified as an MFD. More importantly, of the twenty-five largest cities in the U.S., an average of 29% of the households are classified as MFDs (National Multi Housing Council 2012). If cities continue to overlook the large amount of waste that these MFDs can produce, the consequences could be self-destructive for the following reasons: 1) municipal solid waste (MSW) continues to grow. From 1980 to 2006, nation-wide MSW increased by 66% and shows no signs of, nor any reason for decline. If highly populated areas fail to divert recyclable material from MFDs, the consequences of increased waste production will be more burdensome. 2) MSW programs are often hampered by the sheer quantity of waste they must handle. Complicating this matter, landfills are

expensive and difficult to establish. Consequently, ever-present landfill concerns necessitate a citywide emphasis on conservation (Nixon and Saphores 2009). MFD recycling can extend the life of local landfills by saving space and buying time.

The consequences of the previous two problems are acknowledged in large cities that have instituted 'zero waste' programs; these programs encompass residential and commercial properties. Many are located in California with a state mandate prompting their enactment (Assembly Bill 341), but other programs exist. Local governments – Austin, TX, Boulder, CO, Carrboro, NC, Seattle, WA, Summit County, CO, Kaua'i, HI, San Antonio, TX, and the Central Vermont Waste Management District – have each adopted initiatives in which zero waste is the goal (Liss 2013).

The consequences of increased waste production are highly relevant to the MFD community. As a result of the 'Great Recession' U.S. housing crisis in the late 2000's, household formation slowed. Many would-be owners or renters saved money by 'doubling-up' so that households began to contain occupants who were not the homeowner, spouse, or co-occupant partner. As the economy recovers, a pent up demand, demand resulting from those who 'doubled up,' is being released, spurring MFD construction.

From 1997 to 2007, about 1.5 million households formed each year. That number fell to 500,000 per year during the Great Recession (2007-2010). To put this numbers in context, as household formation decreased by two-thirds during the Great Recession, the U.S. population continued to expand at a rate of 2.7 million per year, only slightly below the 2.9 million per year observed from 1997-2007 (Dietz 2013; Dunne 2012; NAHB 2011; Johnson 2011). A recovering economy is allowing individuals to reenter the market and many of those are seeking to rent rather than own. The resulting demand has reduced vacancy rates and is again encouraging MFD construction. Substantial growth occurred in 2012, evidenced by vacancy rates falling from a high of 11% in 2009 to 8.75% in 2012. As well, total household formation has increased from its low of 500,000 during the recession to 1.1 million in 2011 (Dietz 2013; Dunne 2012). New MFD construction and household formation exacerbates the need to address the MFD waste stream.

The desired outcome of an MFD recycling program is a higher diversion rate (EPA 1999b). As depicted in Table 2.1, R.W. Beck found from a 2009 survey in which 90% of the U.S. population was represented that 48% of all U.S. MFDs have access to on-site recycling, while 69% of all U.S. SFDs have access to curbside recycling. Furthermore, MFDs have a national diversion rate averaging 14.6% and SFDs 16% (EPA 2001). SFDs have an estimated 21 percentage point lead over MFDs with regard to access, yet only a 1.4% percentage lead with regard to diversion rate – MFD diversion rates are almost equal to SFDs despite 70% of the coverage. Consequently, an advantage of MFD recycling is the higher ratio of diversion to access when compared with SFDs. This anomaly is most likely attributed to the high population densities that characterize MFDs.

**Table 2.1 - Comparison of MFD and SFD Access and Diversion Rates**

|  | Access (2009) | Diversion Rate (2001) |
|---|---|---|
| SFDs | 69% | 16% |
| MFDs | 48% | 14.6% |

*Source: R.W. Beck 2009 & EPA 2001*

From these numbers one can glean two propositions: 1) providing MFD tenants more *access* to on-site recycling would increase diversion rates, and 2) judging from the large diversion rate resulting from a small amount of access relative to SFDs, improving tenant *participation* in existing MFD recycling would increase diversion rates.

*The Behavior*

With some background information on MFD recycling, a behavior should be chosen that either improves access or increases participation to improve diversion rates. Notably, this research only addresses the latter, or the idea that improving tenant participation in existing MFD recycling will increase diversion rates. The distinction between access and participation is important. More access provides more opportunities to recycle and a higher diversion rate may result, but it does not ensure that the opportunities are taken advantage of appropriately (Duffy and Verges 2009; Austin et al. 1993). With access, only the 'low-hanging fruit' (those tenants who cared enough to recycle before they had access) are likely to participate. However, a spirit of critical optimism should be applied to the potential diversion rates attainable in MFD recycling programs. Critical optimism is the recognition that failure is possible,

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but that pessimism should not prevent one from trying (Shields 2008). When applied to MFD recycling, it is suggested that the diversion rates of a typical MFD recycling program can be improved by means of increased participation.

## **Barriers**

Researchers continually identify situational, behavioral, and programmatic factors that either encourage or inhibit participation in recycling (Lane and Wagner 2013). This is important because humans will often fall to the path of least resistance when encountering barriers (Thaler and Sunstein 2009). Here, the path of least resistance is identified as throwing all refuse into a trash container. Consequently, even with knowledge, pro-environmental attitudes, and an economic self-interest, MFD tenants could encounter barriers to recycling and still fail to perform the behavior (Ebreo and Vining 2000). Therefore, the presence of barriers to participation in recycling is likely to contribute to low participation rates in MFD recycling. This section will identify those barriers.

### *Convenience*

Barriers to recycling at MFDs typically concern convenience; the EPA (1999a) and others hark on its importance. Jacobs (1984) found that improving the convenience of recycling resulted in higher levels of participation (Ebreo and Vining 2000). Another study found that persons in communities where recycling programs exist believed other residents in the community did not recycle because it is inconvenient, or "require[d] too much time and effort to do so" (Ebreo and Vining 2000, 155).

Furthermore, Woodward et al. (2005) describe how a typical perception of the primary function of waste management is the collection of trash – recycling is often appended as a second thought. This perception is likely a result of the convenience of waste containers (Lane and Wagner 2013). In order to increase participation in recycling, the opposite perception should be engendered, one in which recycling is convenient. Ideally, MFD recycling programs would be so convenient that recycling becomes the default option; recycling program administrators should strive to design MFD recycling programs in this

fashion. In order to maximize convenience, inconveniences should be removed – barriers should be identified so that a strategy may be chosen to overcome them.

*Communal Recycling Areas*

Caution is warranted when attempting to create universally applicable models for recycling programs (EPA 1999a). Wood (1991, 34) and others call attention to how the different physical structures of MFDs call for varying systems and approaches to waste management because "a densely occupied high-rise building has different needs from a waterfront condominium or a garden-style cooperative." As well, it is often stated that MFDs of the same city could be vastly different, using a range of diverse service styles and/or contracted haulers (Wood 1991; Lease 2001). These statements are true; however, it is also true that MFD recycling programs retain a specific infrastructure, one in which recycling areas are located at central locations on the property, referred to here as communal recycling areas (Lease 2001). This location may be at the end of the hallway in a high-rise, in the parking lot of a large apartment complex, or in the alley of a downtown loft. Communal recycling areas are a universal feature of existing MFD recycling programs.

Communal recycling areas may be the result of the need for MFDs to fit into a pre-existing waste management structure. SFDs typically use 60 or 90-gallon roll carts and practice curbside collection to allow automatic loaders easily access (EPA 1999b). In order to fit into this pre-existing structure, MFD recycling collection systems often to use the same 90-gallon roll carts (EPA 1999a). Consequently, carts need to be by the curb on pick up day (Olsen et al. 2010). At MFDs, curbside-pick means that carts will be clustered beside the curb so workers do not have to gather them from various, remote locations around the property on pick up day (EPA 1999b). That storage location becomes the communal recycling area. Apart from 90-callon carts, many MFDs use recycling dumpsters. Like roll carts, recycling dumpsters are serviceable by automatic loaders and are located at central areas of the property.

Communal recycling areas exist in all MFDs. It does not matter if 90-gallon roll carts or recycling dumpsters are used or whether the communal recycling area is outside or inside, each format results in a communal recycling area. Figure 2.1 illustrates an example of this commonality.

**Figure 2.1 – Example of a Common MFD Structural Layout with a Communal Recycling Area**
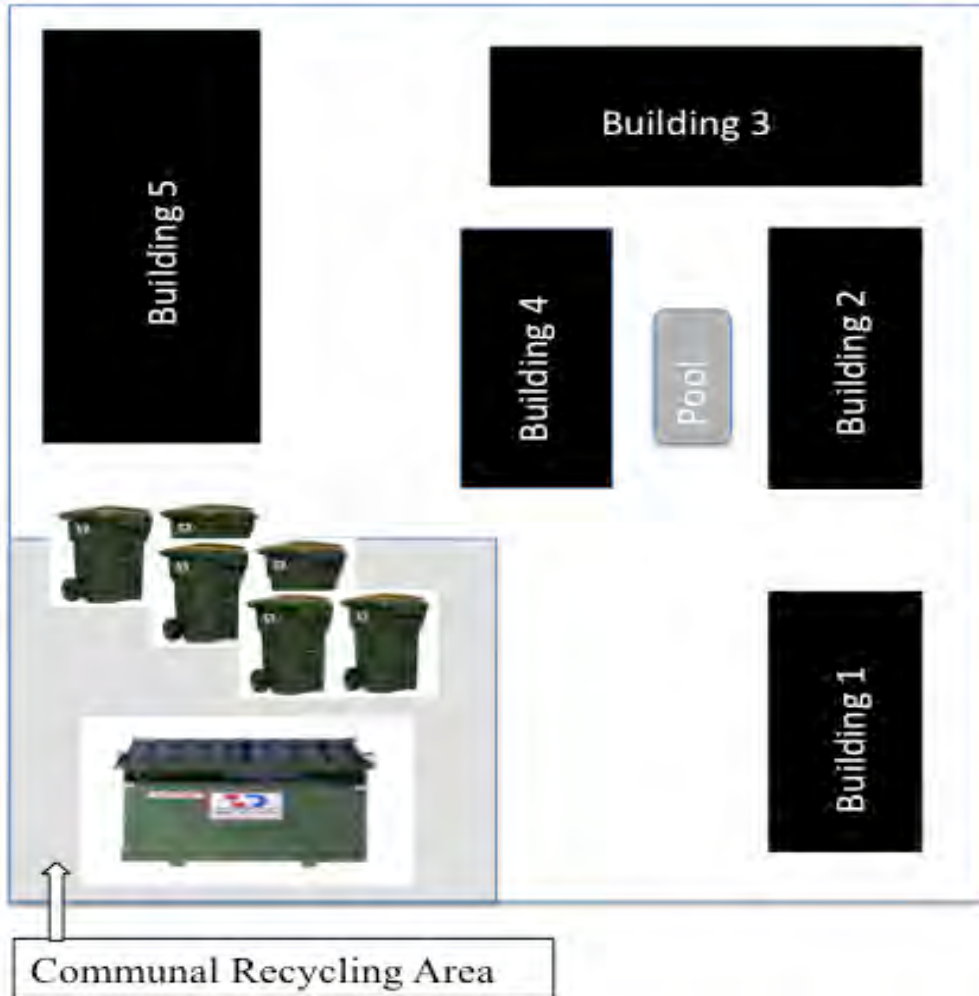


By examining MFD recycling from the ground level, barriers to recycling become evident. Communal recycling areas are identified as a source of considerable inconvenience, creating barriers and increasing the transaction costs to recycle (Shrum et al. 1994). Barriers to participation in recycling at MFD recycling programs are identified as 1) transporting recyclables, 2) storing recyclables until they can be transferred to the communal recycling area, and 3) finding interior or exterior space to store recyclable materials (Aceti Associates 2002; EPA 1999a). Within this current structure, the transaction costs needed to overcome the barriers often do not outweigh the benefits of recycling.

*Barrier #1 - Transportation*

The first identified barrier is transportation (Chamberlain 2008). Let's assume an MFD tenant is willing to make the trip to the recycling area; what will she or he use to transport the recyclables? It can be difficult to get recyclables from point A to point B, not because of lateral distance but other structural and environmental variables, such as moving containers up and down stairs or over unpaved walkways (Wagner 2013). Interestingly, Wagner's analysis applies to SFDs and assumes the recycler has a container to transport. Here we come to a primary distinction between SFDs and MFDs. Those who inhabit single-family dwellings are provided personal plastic bags, a personal tub, or a personal roll cart designated to store recycling and ultimately transport recyclable materials to the curb. However, "a solid majority of the [U.S.] communities do not target MFDs with recycling [containers] specific for MFDs." (Folz 1991; Lane and Wagner 2013). Typically, MFD tenants do not encounter the inconveniences of transporting a personal recycling container to the communal recycling area, as they did not receive one in the first place.

This disparity between SFDs and MFDs is important; Hadleman and Turner (2009) found one of the top five factors in a person's recycling decision is having a container that is easy to move. MFD tenants cannot move recycling containers if they were never provided one. Consequently, MFD tenants must move from point A, the unit, to point B, the communal recycling area, without help. This distance necessitates the use of a tool to ease the transport of recyclables. Thus, the natural question arises, 'Why are SFDs provided a personal recycling container, but MFD tenants are not?'

*Barrier #2 – Storage*

The second barrier to participation in MFD recycling is the unavailability of a vessel to store recyclable material until it can be transported to the communal recycling area. Obtaining a container in which to store recyclable material, one that considers the constraints of MFD recycling, can be difficult. Home remedies such as plastic grocery sacks or cardboard boxes are inefficient, leaving much to be desired. This barrier is associated with the need to transport – by providing a container, MFD tenants are able to store and transport recyclables.

*Barrier #3 –Space*

The provision of personal recycling containers begs another concern, the spatial constraints of MFDs. Adequate space to store recycling is positively correlated with higher recycling rates (Ando and Gosselin 2005). SFDs have extra storage areas such as pantries, garages, or porches that MFDs do not – MFDs are small and extra space is valuable. Hence, adequate storage space is identified as the third barrier (Chamberlain 2008; Thomas and Sharp 2013). Recycling containers should be designed to accommodate tenant's scant storage space.

Most MFD tenants do not have interior space for a recycling container or are not willing to give the space up (Lane and Wagner 2013; Olson et al. 2010). The Aceti Associates (2002) support this claim by finding that a common barrier to recycling at MFDs, from the view of property management, is the limited or non-existent interior or exterior storage area. Nixon and Saphores (2009) came to similar conclusions, suggesting that a perceived lack of space to store recyclables presented a barrier to recycling. Still further, Ando and Gosselin (2005) support these ideas with their finding that apartment dwellers with adequate storage space are 10-12% more likely to report a recycling rate above zero. Unfortunately, MFD property managers are known to be quite controlling with the exterior of their buildings. Lease contracts often state what can or cannot be placed on tenants' front porches, often leaving interior space as the only viable storage area.

## Identify a Strategy: Personal Recycling Container Provision

The challenge has now been set – how to create an integrated workable system that is compatible with current waste system management structures while addressing the transportation, storage, and spatial barriers to participation in MFD recycling programs (Wood 1991). According to Lane and Wagner (2013), recycling containers are easily controlled in any recycling program and can also be used to facilitate collection efficiency. Furthermore, Folz (1991) found that the provision of recycling containers made participation more convenient. It is known is that recycling programs with high diversion rates typically service fewer units per communal recycling area (Aceti Associates 2002; Wagner 2013). With a

personal recycling container, the recycling area services as few tenants as possible – only those occupying the unit.

In light of a container's ability to improve convenience by helping tenants to overcome barriers, providing MFD tenants recycling containers is identified as this study's universal strategy. With regard to transportation, this strategy is universal because all MFD recycling program infrastructures are similar. With regard to storage, this strategy is universal because MFD tenants traditionally do not receive personal recycling containers. Last, with regard to space, this strategy is universal because containers can be designed to accommodate the small spaces that characterize MFD units (Olson et al. 2010; Lane and Wagner 2013; Ando and Gosselin 2005; Aceti Associates 2002).

**Behavior Modification Tools**

The provision of personal recycling containers to MFD tenants is the subject of this study; however, it is not sufficient to only provide containers, recycling program administrators should strive for tenants to participate by using them to recycle. Folz (1991, 222) addresses this challenge, "[c]hief among these [challenges] is how to maximize and sustain citizen participation in recycling." Self-control issues are likely to appear when a choice and its consequence are disjointed in time. Those who make pro-social choices with disjointed consequences have contributed to public investment goods. Investment goods do not realize the benefits of expenditure for quite some time. Likewise, the benefits of sustainability activities take time to accrue. It can be difficult to continuously practice sustainable behaviors while receiving minimal feedback.

Hence, the sustainable activity 'recycling' is a public investment good. Feedback and/or immediate benefits from MFD recycling programs are often non-existent. Consequently, most tenants fail to find the motivation and err on the side of recycling too little or not at all. Bearing this in mind, it can be concluded that participation in recycling must be strategically encouraged using behavior modification tools (Folz 1991; Thaler and Sunstein 2009).

Thaler and Sunstein (2009) present the concept of nudging. A nudge is "any aspect of the design of choices that alters a person's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein 2009, 6). To nudge is to covertly use behavior modification tools. As well, nudges fit neatly into public programs for the societal good in that they encourage citizens to make choices that would benefit themselves. Public administrators who understand how difficult it is to encourage citizens to practice sustainable behaviors should nudge. When applied to recycling, nudges should help combat the negative ramifications of a lack of feedback and benefits. Recycling program administrators should use behavior modification tools such as prompting, social normalization, and communication to nudge tenants towards participating in recycling (McKenzie-Mohr 2011). Each tool is expanded upon below.

*A. Prompts*

Sustainable behaviors are habitual. Altering habitual behavior requires a difficult lifestyle change, but prompts can help. A prompt is a visual or auditory clue used to remind a person to carry out an activity that is typically forgotten (McKenzie-Mohr 2011). The ecological approach to perception asserts that objects provide unique noticeable affordances, or clues for humans to act in a particular way (Duffy and Verges 2009). Prompts capitalize on the ecological approach to perception; however, some prompts are well crafted and others are not. If a door were to have a vertical handle prompting the user to 'pull' but open outwards instead, the prompt would be poorly designed. However, if the same door had a metal plate implying 'push,' the prompt would be proper since the door does indeed push outward (Thaler and Sunstein 2009).

McKenzie-Mohr (2011) suggests a checklist when using prompts towards sustainability: 1) make the prompt obvious, 2) make the prompt self-explanatory, 3) prompt as close in time and space to the target behavior as is possible, and 4) use prompts to encourage behaviors rather than discouraging avoidance of harmful ones.

The ability to perform a sustainable behavior does not mean that it will be performed; recycling program administrators should be concerned with how to prompt so that behavioral compliance increases. Duffy and Verges' 2009 study concludes that prompts can work for recycling. They monitored recycling containers with specialized lids, the size of the hole indicating the correct item, to find that diversion increased by 34% and contamination decreased by 95%. Contamination refers to non-recyclable items that were improperly disposed in recycling containers. The special lids prompted users into compliance; likewise, recycling program administrators should prompt MFD tenants to recycle.

### B. Social Normalization

Normalizing can be a viable tool to alter tenants' recycling behavior. Normalization is simply the act of making something culturally normal. Norms appear in two forms: injunctive and descriptive. Injunctive norms provide information on the behaviors one is expected to enact and those to avoid. Descriptive norms provide information on what behaviors are actually performed. No matter the injunctive norm, descriptive norms convey what people actually do (Thomas and Sharp 2013). To understand the difference, examine a famous public service announcement (PSA) campaign, the "Iron Eyes Cody" commercial spot. This PSA depicts a Native American weeping at the sight of litter. The message was given in-text on the screen – littering is not approved (injunctive norm). However, in the background of the screenshot there is much litter on the ground, indicating many people actually do litter (descriptive norm). Although the injunctive norm indicated littering is not approved, the littered-ground insinuated that people do it anyways, ultimately lessening the impact of the real message. This commercial spot inadvertently utilized both norms in direct conflict with each other. Hence, norms must be used quite cautiously (Cialdini 2003). Information campaigns, correctly utilizing both injunctive and descriptive norms, could significantly influence people's recycling intentions (Cialdini 2003).

Thus, it is possible to apply norms to recycling container provision at MFDs. In this case, injunctive norms would let MFD tenants know that others expect him or her to recycle – an example could be an email from property management instructing tenants to recycle. Opposite, descriptive norms

would let tenants know the true behaviors of other tenants – if tenant A were to see tenant B placing trash in a recycling container, tenant A is more likely to think that recycling is not a serious policy.

Another example of a descriptive norm occurs with more visible recycling containers in that they are more likely to be "viewed as a behavioral norm and non-participation will be more conspicuous" (Lane and Wagner 2013, 34). Similarly, Hadleman and Turner's 2009 study suggests that normalization can affect recycling behavior when non-participation becomes obvious. On pick up day in a SFD recycling program, with rows of recycling roll carts lining the streets, the absence of a cart became conspicuous. Houses without a recycling cart appeared abnormal. Theoretically, previously non-recycling residents began recycling and then placed their recycling cart by the curb on pick up day so their behavior was perceived as normal.

Conversely, the Aceti Associates (2002) reject the notion that normalization can occur in MFD recycling programs. They claim that the communal nature of recycling areas constrains the ability to observe who recycles, limiting the sway of descriptive normalization. The Aceti Associates' (2002) assertion is correct, but only when operating under the assumption that MFD tenants do not use personal recycling containers. With personal recycling containers, normalization can occur in different forms, such as the presence of a 'normal' or standardized recycling container in every MFD unit of a municipality or the observation of fellow tenants emptying their personal recycling containers into the larger, communal roll carts. Recycling program administrators should incorporate social normalization when designing MFD recycling programs.

*C. Communication*

Recycling program administrators should not expect success if methods for program compliance are not convincingly communicated to tenants. In order to convince, one must first capture another's attention. Information that is clear, vivid, and concrete tends to capture attention. Using behavior modification tools, one can identify by *who* is communicating to what extent the message will be clear and convincing, i.e., have the broadest impact on behavior.

Research indicates personal contact is the most effective method of altering humans' attitudes and behaviors (McKenzie-Mohr 2011). As well, DeVito (2004) relates the concept of interpersonal power. Power is the ability to influence what another person thinks or does. The extent of such power is defined as the degree of ownership those under power maintain in thinking and doing. A fundamental principle of power is that some people are more powerful than others (DeVito 2004). Understanding who holds certain powers is fundamental to the public administrator in any public program. Public administrators should choose the appropriate power source to present convincing messages about sustainability programs such as recycling.

Legitimate power is held when others believe an individual holds power by right or by virtue of position. Legitimate power "stems from a belief that certain people have the right to influence us because of who they are" (DeVito 2004, 343). The President of the United States or a church pastor would *typically* hold legitimate power – legitimate power is a product of perception. Individuals must decide for themselves if an individual is legitimate enough to be awarded power. Coercive power is held when one has the ability to punish another. If an individual were to determine that the power holder could control their fate, submission is likely. However, coercion depends on the magnitude of punishment and likelihood it will be administered (DeVito 2004). As an example, law enforcement officers or a college professor hold coercive power. Referent power is derived from others' desire to be identified with or be like another. Referent power depends largely on attractiveness and prestige (DeVito 2004). If a person decides that they want to be like another, she or he becomes a follower and the other empowered as a referent.

### *D. Incentives*

Another strategy is to incentivize a behavior; however, rewarding is not always easy or appropriate. The communal nature of MFD recycling areas creates difficulties when attempting to reward recycling behavior. It may be impossible to identify who recycled what amount. Furthermore, rewards only work in the short-term (Ebreo and Vining 2000). Once rewards are discontinued, behaviors return to

baseline levels. The application of incentives is universal in that most humans will respond, but their temporary nature render them unfit, especially when attempting to fundamentally alter a tenant's behavior. This research suggests incentives should not be used in MFD recycling programs.

**Chapter Summary**

This chapter sought to gain a better understanding of the various MFD environments in an attempt to identify barriers to participation in recycling. First, it was discussed how sustainable behaviors are habitual and decisions regarding sustainability are prevalent in people's lives; thus, a fundamental change in human behavior is required. The community-based social marketing approach properly facilitates this change. CBSM's bottom-up approach to problem identification and solution production was found to outweigh traditional information intensive methods. Second, an examination of the prevalence MFDs and waste in our society led to the identification of a behavior to address – participation in recycling at MFDs. Barriers to participation were found to be based on the universal inconveniences created by similar MFD recycling program structures. Barriers were identified as transportation, storage, and space.

Third, the identification of barriers led to the suggestion of a universal strategy – the provision of personal recycling containers to MFD tenants. The provision of personal recycling containers is a universal solution to the universal barriers of transportation, storage, and recycling. Last, it is difficult to reorient people's behavior towards sustainability. In light of this issue, behavior modification tools were presented as a method of motivating continued participation in recycling.

The strategy has been identified – the provision of personal recycling containers to MFD tenants – but a practical model to guide recycling program administrators in the provision of those recycling containers does not exist. In order to create that model, the next chapter presents an overview of SFD recycling, MFD recycling, and general recycling behavior. Through this literature review, components of recycling container provision will be formed and criteria to define those components will be established.

# CHAPTER 3 – LITERATURE REVIEW

## *Introduction*

The fact stands that there is research-policy-practice gap in multifamily dwelling (MFD) recycling programs. Furthermore, it is often asserted that no single recycling program model is universally applicable to all MFDs. MFDs typically include, at least, multiplexes with 5 or more units, apartments, and apartment complexes. This research argues that models can be universally applicable and aims to contribute to the MFD recycling literature.

In pursuance of this objective, the previous chapter identified three universal barriers to recycling at multifamily dwellings – transportation, storage, and space. A review of the literature helped identify a solution that is universal as well – the provision of personal recycling containers. Several authors state the fact that some MFD programs provide personal recycling containers to tenants to append the communal recycling area infrastructure (Lane and Wagner 2013; Lease 2001), but proper research is nonexistent.

Consequently, a literature-supported set of best practices for personal recycling container provision to MFD tenants does not exist. Thus, the purpose of this study is to develop a practical ideal model for the design and distribution of personal recycling containers to multifamily dwelling tenants. This chapter will review the literature to form the components of container provision and establish defining criteria within each component. Within each component's criteria, 'best practices' will be suggested. Components, criteria, and best practices will then be structured into the outline of a provisional model (Table 3.7). Components are identified as (1) design and (2) distribution. Design is dependent upon five criteria and distribution upon three. Behavior modification tools are incorporated into provision as well, improving the chances that tenants will use their recycling containers after initial distribution.

## I. Design

Every container should tell a story (Chappells and Shove 1999). The first component of recycling container provision is design. Design is divided into five criteria: A) capacity, B) message, C) color, D) form, and E) handles.

### A. Capacity

Capacity, or volume of the recycling container is a criterion of design. Capacity should be chosen on the basis that it adequately serves the needs of MFD tenants. Several factors help determine what container capacity should be chosen. Local collection system styles are one of these factors. Collection systems can be comingled (single-stream), meaning all recyclables are stored in a one-compartment container; or, collection systems could be separated (multi-stream), meaning the materials are separated. Recycling program administrators can use average material densities, dependent on their style of collection, to determine what capacity would work best for their locale (Lane and Wagner 2013). Average material densities communicate the "densities of recyclable material that are realized under different operating conditions" (Apotheker 1991, 69). Here "different operating conditions" refers to the number of streams in the collection system.

A second factor that can help recycling program administrators determine capacity is the number of occupants per unit. If recycling program administrators can determine the typical number of occupants in local MFD units, choosing a capacity becomes much more of a science. For instance, assume an MFD recycling program utilizes a comingled collection system and wishes to provide tenants with personal recycling containers. The comingled recycling system will be used in this example because 59% of all U.S. collection systems practicing curbside recycling are commingled (R.W. Beck 2009). In order to estimate the average container capacity (volume) needed per MFD unit, one must have knowledge of trends in human disposal.

The average American disposes of 4.43 lbs. of personal waste per day (EPA 2011). In 2010, the average U.S. diversion rate was 34.1% – meaning 1.51 lbs. of that 4.43 lbs. of waste was recycled (EPA

2011). Table 3.2 depicts the calculations for total pounds of recycling per unit per day based on number of occupants. For instance, three occupants would produce 4.53 lbs. of recycling each day (1.51 x 3 = 4.53).

**Table 3.2 – Total Pounds of Recycling by the Number of Occupants in a Unit**

| Occupants | | Lbs. Per Person | | Total Unit Lbs. |
|---|---|---|---|---|
| 4 | x | 1.51 | = | 6.04 |
| 3 | x | 1.51 | = | 4.53 |
| 2 | x | 1.51 | = | 3.02 |
| 1 | x | 1.51 | = | 1.51 |

*Source: EPA 2011*

Next, average material density for comingled recycling is 140.1 pounds per one cubic yard (WRAP 2010; EPA 1997). Average material density in a landfill is calculated as gallons per cubic yard and there are 201.97 gallons in one cubic yard. In other words, one pound of single stream recycling occupies 1.442 gallons of space. Hence, the following are equivalents:

$$(140.1 \text{ pounds} = 1 \text{ cubic yard} = 201.97 \text{ gallons})$$
$$(1 \text{ pound} = 1.442 \text{ gallons})$$

With knowledge of how many pounds of recycling an MFD unit produces per day, gallons per unit per day can be calculated. A unit's total recycling poundage multiplied by gallons of space consumed by a single pound of recycling equals a unit's total gallons per day based on occupants. Table 3.3 depicts this conversion.

**Table 3.3 – Total Gallons of Recycling Produced by 1-4 Occupants, Per Day**

| Occupants | Total Unit Lbs. x Gallons Per Pound | Gallons Per Day: |
|---|---|---|
| 4 | 6.04 x 1.442 | 8.707 |
| 3 | 4.53 x 1.442 | 6.531 |
| 2 | 3.02 x 1.442 | 4.354 |
| 1 | 1.51 x 1.442 | 2.177 |

Wood (1991) relates the experience of Allentown. Allentown distributed recycling containers to MFD residents. The containers were anywhere from 5 - 7 gallon buckets, 13 and 14 gallon curbside containers, or larger roll carts (recycling container capacities are also measured in gallons). Wood (1991) does not explicitly state that the roll carts were meant for outside use, but one can infer the fact. This inference is bolstered by Lease's (2001) claim that most MFD units will not accommodate the 14 - 20 gallon containers. Hence, it is assumed that the roll carts Wood refers to are too large, and that 13 gallons would be the largest personal recycling container capacity for MFDs. With knowledge of various

recycling container capacities, it can be calculated how many days would be needed in between trips to the communal recycling area (Wood 1991). Allentown's 5 - 7 gallon container example and Lease's suggestion to stay within 14 gallons are used to form a frame of 5 - 13 gallon capacity containers.

Using the 5 – 13 gallon capacity frame for reference, Table 3.4 illustrates the average days between trips to the communal recycling area depending on two factors: occupants per unit and recycling container capacity. The rows represent 1 through 4 occupants per unit and the columns represent 5 through 13-gallon capacities. By dividing a selected gallon capacity by the average gallons of recycling produced per unit per day, the average number of days between trips to the communal recycling area can be calculated.

**Table 3.4 – Average Days Between Trips to Communal Recycling Area**

| Occupants | 5 Gal. | 6 Gal. | 7 Gal. | 8 Gal. | 9 Gal. | 10 Gal. | 11 Gal. | 12 Gal. | 13 Gal. |
|-----------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| **4.00** | 0.57 | 0.69 | 0.80 | 0.92 | 1.03 | 1.15 | 1.26 | 1.38 | 1.49 |
| **3.00** | 0.77 | 0.92 | 1.07 | 1.22 | 1.38 | 1.53 | 1.68 | 1.84 | 1.99 |
| **2.00** | 1.15 | 1.38 | 1.61 | 1.84 | 2.07 | 2.30 | 2.53 | 2.76 | 2.99 |
| **1.00** | 2.30 | 2.76 | 3.22 | 3.67 | 4.13 | 4.59 | 5.05 | 5.51 | 5.97 |

The literature suggests a positive relationship between recycling rates and container size (Lane and Wagner 2013). Consequently, one should aim for as large a capacity as possible in order to maximize the number of days in between trips to the communal recycling area. Decreasing the number of trips increases the convenience of participation, a main goal of this research. However, bin shape should be strongly linked to the physical layout of MFDs (Chappells and Shove 1999). Although size is positively related to diversion, the space where the container will be stored must be considered as well.

Although it is impossible to definitively know where tenants will keep their containers, it is possible to use a universal feature of all MFDs - base cabinets - to design a recycling container so that if it has to be stored, it would always fit. Base cabinets are kept to an industry standard; every stock under-the-sink base cabinet in MFDs across the U.S. *should be* 24 inches deep and 34.5 inches tall in the interior. The widths of the base cabinets do fluctuate. Consequently, MFDs could have custom base cabinets, but most do not. MFDs are built with the principle of repetition in order to keep costs low. Thus, a container

should be designed so that its dimensions will always allow it to be stored in under-the-sink base cabinets of MFDs. Considering the importance of selecting a capacity that takes into account various numbers of occupants, the positive relationship between container size and recycling rates, and the advantage of universal base cabinets, personal MFD recycling containers should be from 5-13 gallons.

### B. Message

A recycling container is not just a tool – per community-based social marketing it is a strategy. As a strategy, one realizes a recycling container is more than a transportation and storage apparatus, but could be used to communicate or educate as well. Thus, message is a criterion of design. Typically, the suggested approach to educating MFD tenants on correct recycling behavior is the repeated distribution of printed material, flyers, mailings, etc. This approach is noted as being expensive (Zaletnik et al. 2004). However, printed materials are typically discarded, necessitating a new round of education. Chamberlin (2008, 13) reveals, perhaps unwittingly, this issue with printed material, "Residents will eventually recognize these [printed materials] as recycling information pieces and will hopefully save them and reference them when needed." Eventually and hopefully are not words that exude confidence.

If an MFD recycling program has decided to provide personal containers, why should the surface of the container not be utilized as an area to educate and inform? Thomas (2001) supports the idea of printing information on containers. Inscribing educational information on container sides can reduce the need for separate printed material. Here, the message is more continuous than if it had come through printed materials; tenants are less likely to discard a recycling container.

Notably, container-inscribed messages have been proven to alter patterns of waste disposal. An example is the request for 'no hot ashes' on residential trash roll carts (Chappells and Shove 1999). Here, designers eliminated the need for annual printed literature by using the roll cart to educate residents. Likewise, messages on the surfaces of recycling containers can prompt tenants to a desired behavior. This prompt is in line with the community-based social marketing approach as McKenzie-Mohr (2011, 90) states, "[t]he prompt should be presented as close in time and space as possible to the targeted

behavior." The closest one can get in time and space to recycling is when looking at the personal recycling container itself, especially if kept by a trash receptacle in the under-the-sink base cabinet.

Regarding format, container-surface signage and labels should be identical so that no matter where an individual is in a city, the same messages are found (Zaletnik et al. 2004; Chamberlain 2008). Identical messages are likely to invoke the memory of the recycling containers one has previously encountered, and remembering the meaning of a previously encountered message is likely to elicit a prompt to act (Boisclair 2010). In addition, identical messages eliminate the transaction costs to learning a new collection system. With an understanding of the value of surface area education and identical messages, the various aspects of the criterion 'message' can be explored. These variables are content and communication style.

Considering content, MFD tenants must be informed about what is expected of them (Folz 1991). The public can find it difficult to remember or are not aware of what to recycle (McKenzie-Mohr 2011). Thus, recycling programs that produce clear and specific messages about recycling make it easier to recycle (McKenzie-Mohr 2011). It is suggested that a container's message should communicate, very clearly and specifically: 1) what can/cannot be recycled, 2) how to recycle, 3) where to recycle items that are not accepted by the contracted recycling hauler, and 4) contact information for recycling questions (City of Beaverton 2012; Boisclair 2010; McKenzie-Mohr 2011; Thomas and Sharp 2013).

It is also important to supply tenants with information on where to recycle items not accepted by the contracted recycling hauler. These items could be tires, large electrical appliances, or scrap metal (Chamberlin 2008). For example, Beaverton, Oregon distributes tote bags with imprinted instructions on where to dispose electronic waste (City of Beaverton 2012). Last, tenants should be provided contact information for questions related to recycling, such as a local recycling program administrators' contact information.

Considering communication style, some assert pictures or graphics should receive more emphasis than text (Aceti Associates 2002; Chamberlain 2008; Lane and Wagner 2013; Olsen et al. 2010). The City of New York uses graphics in their recycling campaign, as does the City of Los Angeles. Diverse

populations of non-English speakers certainly fuel these strategies, but an emphasis on non-text also has another benefit (Zaletnik et al. 2004). The time lost and effort necessary to read text on a recycling container is likened to a transaction cost. For those non-recyclers who decide to recycling on a whim, the ability to immediately decode a graphic or picture and comprehend what material is accepted for recycling could mean the difference between following through on the behavior or giving up because of inconvenience and confusion. Although graphics and pictures are more universally understood, text should still accommodate locally spoken languages. Text can convey non-traditional recycling information that graphics or pictures cannot; as well, there are those who prefer text.

Taking these concerns into consideration, it is found that messages should be printed directly on the sides of MFD recycling containers. These messages should be simple and easy to decipher and identical throughout the area that the recycling program encompasses. Messages should contain at least: 1) what can/cannot be recycled, 2) how to recycle, 3) where to recycle items not accepted by the contracted recycling hauler, and 4) contact information. Pictures and graphics should be primarily used to communicate these messages, but text in local languages should be included in support of non-text.

### C. Color

Color is a criterion of design. Recycling containers should be color-coded to communicate their specific use (Chappells and Shove 1999). Montazeri et al. (2012) found that the use of salient colors increases the use of recycling containers, assuming all other aspects are equal. Salience causes recycling containers to stand out, elicit attention, and is more likely to promote recycling behavior. Lane and Wagner (2013) found from a nationwide survey that recycling containers were most likely to be blue (51.9%), green was next with 25.5%, and gray was third with 8.4%. Similarly, Boisclair (2010) claims most recycling containers in the U.S. are blue, although Montazeri et al. (2012) found that green is a more memorable color than blue. Taking these claims into consideration, blue is most prominently associated with recycling. However, there is no universal color standard for recycling; hence, there exists no universal perception of a recycling color.

If a color is conditioned correctly, upon recognition of that specific color humans are prompted to act, or receive a cue to what is considered normal behavior (Lane and Wagner 2013). Hence, a particular color will prompt individuals to recycle if it reflects the usual or normalized color that those individuals attach to recycling. Consequently, recycling containers do not have to be blue. If the localized culture or norms indicate another color denotes recycling, then that color should be used. For instance, a municipality may want to make recycling containers match the color of the local football team (culture), or green could be identified as the color locals typically perceive to indicate recycling (norm). Consequently, recycling containers should be blue unless localized culture or norms indicate another color is more prominently associated with recycling.

*D. Form*

Literature describing MFD-specific recycling container form is not available, but various decisions concerning materials indicate it is a criterion of design. Recycling containers typically take the form of a bin (also known as a tub or roll cart). Bins are traditionally made of hard shell materials. However, some MFDs have instead elected to provide tote bags (Lane and Wagner 2013). Tote bags are made of synthetic materials. Therefore, 'hard shell' and 'bin' are one in the same - hard shell bins; likewise, 'synthetic material' and 'tote bag' are one in the same - synthetic tote bags. Ultimately, choosing a form (bin or tote bag) hinges upon concerns regarding each respective material's degree of utilitarian functionality and price. These concerns are: 1) flexibility, 2) the various types of synthetic and hard shell materials, 3) the ability to print messages on materials, and 4) fiscal concerns.

First, synthetic materials are much more flexible than hard shell materials. Synthetic materials can be folded into an extremely efficient shape for shipment or when in storage and can widen if necessary. For example, if a synthetic tote bag is distributed to accommodate a mean number of gallons of recycling per MFD unit, the tote bag's ability to widen could prove useful for those units with diversion rates larger than average. However, hard shell bins are usually stackable, saving space as well. Hence, a tenant could own three bins, but they would only consume the space of one bin.

Second, within the umbrella terms 'synthetic' and 'hard shell' there are various materials to choose from. Concerning synthetic materials, Zaletnik et al. (2004) and Multibag, a company specializing in recycling tote bags, each suggests polypropylene. Other synthetic materials are used to make tote bags, such as polyester and nylon, but sources point to polypropylene. Polypropylene is superior to other synthetic tote bag materials because it does not absorb water and dries faster than nylon and polyester (Quinn 2013). Polypropylene is also a recyclable material, accepted at facilities that receive number 5 plastics. Any of these three synthetic materials can be woven or non-woven. Woven tote bags are made with yarns placed at right angles to one another, and non-woven tote bags are made by gluing or by melting yarns together. Wovens are normally stronger because of the layers; however, non-wovens are typically more affordable (Quinn 2013). If a hard shell material is chosen, identifying the ideal material is much more simple. While recycling bins have commonly appeared in several forms – metal and plastic – the most popular material is plastic. Rigid plastics are advantageous over metal because they are cheaper, more resist to corrosion, resist more impacts, are lighter, and can be color coded to denote recycling (Solar Plastics, Inc.).

Third, one should consider the surface area available on containers. Container-surfaces should be used as an educational tool. In light of this consideration, one should consider the advantages and disadvantages of printing on particular materials. For example, it is easier to imprint color messages on tote bags than on bins.

Fourth, fiscal considerations could necessitate a closer emphasis on container price. Hard shell materials are more expensive than soft shell materials. This statement is supported by Seattle's claim that their tote bags, 'blue bags,' are a good value. Their tote bags for MFDs cost $1.81 apiece compared to the $15 single-family dwelling residents pay for their bins (Zaletnik et al. 2004). Taking the various concerns of form into consideration, if tote bags are chosen, woven polypropylene should be used. If bins are chosen, rigid plastic should be used.

*E. Handles*

Handles are a criterion of design. Handles are simple but very useful. After praising recent advances in waste container design, Boisclair (2010) also criticizes one of the latest models, the Mejer 16-Gallon Automatic Recycle Touchless Trash Can, for its lack of handles for transportation. One can infer that Boisclair recognizes handles as making transportation more convenient. Zaletnik et al. (2004) suggest designing broad handles if utilizing tote bags because they increase portability and allow the bag to be hung on doorknobs, minimizing consumed space. Hence, handles increase the convenience of recycling containers and should be incorporated.

Notably, some MFD recycling programs (e.g. City of Beaverton 2012) have elected to attach a handle to the bottom of their tote bags so that when emptying, tenants can perform the activity in one motion. Otherwise, tenants must grab the bottom of the bag itself to tilt out the contents. 'Bottom handles' exhibit advantage of soft shell tote bags. Vendors can fulfill a customer's request to add handles as needed; it only requires sewing. Opposite, vendors cannot add handles to rigid plastic or metal containers as desired due to the use of preset molds. Consequently, no matter to the chosen form, handles should always be a feature of recycling containers. If a tote bag is chosen, handles should be incorporated into the bottom of the bag.

## II. Distribution

The second identified component of personal recycling container provision at MFDs is distribution. Distribution entails three criteria: A) determining from whom tenants obtain recycling containers, B) the format of this obtainment, and C) recycling container pricing scheme.

*A. Distributor*

The role of distributor is a criterion of distribution. The role of distributor is not suggested, identified, or defined by scholarly literature, but the act of distribution necessitates the role of distributor. Consequently, a tentative definition is offered – the distributor is the individual or group of individuals who transfers recycling containers into the possession of MFD tenants. Without direction, the MFD

recycling stakeholder pool will be used to start searching for the most effective distributor. Current scholarly literature reveals three stakeholders in MFD recycling programs: tenants, MFD property management, and the local government-associated or employed recycling program administrators. General recycling literature often includes the contracted recycling hauler as a stakeholder; however, literature on MFD recycling does not indicate that haulers have as much 'skin in the game' when it comes to MFD recycling. As such, the hauler will be left out of the official stakeholder pool. Recycling program administrators should choose the stakeholder(s) with the highest chance of positively influencing tenants' recycling behavior. The social behavior modification tool discussed in Chapter 2 - interpersonal power - helps determine who would have the most impact. Those possessing legitimate, coercive, or referent interpersonal powers should be identified and utilized to distribute containers.

Either MFD property management or recycling program administrators can hold legitimate power; however, the degree to which each holds this power is subjective. Some tenants may grant MFD property management and recycling program administrators legitimate power because they believe those in charge are rightly in that role, that they have something others do not. Other tenants will see each as only a manager and an administrator, lacking the appropriate qualifications to be given legitimate power. However, those with legitimate power can also act as powerful purveyors of injunctive norms. Injunctive norms provide information on which behaviors are typically approved or disapproved (Thomas and Sharp 2013). In this situation, tenants would hypothetically let those with legitimate power impress injunctive norms upon their own beings out of respect for the power holder. It is implied, by the definition of legitimate power, that either property management or recycling program administrators should distribute recycling containers (DeVito 2004).

Next, property management and recycling program administrators each have the ability to hold coercive power, if they wish. Different from legitimate power, those with coercive power can forcefully apply injunctive norms. Property managers have the ability to withhold deposits, apply fines, implant fee structures into leases, and evict; however, punishment must be carried through or credibility is lost. Recycling program administrators who work for or are associated with local governments can hold

coercive power as well, but usually not over the tenant. A local government would not typically punish an MFD tenant for infractions but would punish property management instead. Thus, it is implied by the definition of coercive power that property management should be the distributor.

Identifying the appropriate distributor necessitates a modification of the definition of tenant as a stakeholder. Here, tenant will refer to the *fellow tenants* residing in the same complex as the tenant who will obtain a recycling container. Fellow tenants could be a good fit for the role of distributor because they are the only stakeholders with referent power. Humans are likely to imitate and/or heed the behavior and instructions of those they perceive as being similar to themselves (Thomas and Sharp 2013). Equally, tenants are more likely to align themselves with fellow tenants as opposed to property management or a recycling program administrator. Furthermore, using tenants as distributors strategically harnesses both injunctive and descriptive norms. Descriptive norms provide information on what behaviors are actually performed by others (Thomas and Sharp 2013). Obtaining a recycling container from a fellow tenant would imply that other individuals, characterized by similar living situations, are compliant and recycle (descriptive norm). As well, tenants acting as distributors could instruct fellow tenants about what is expected of them (injunctive norm). Thus, the tenant distributor, utilizing social normalization, could apply pressure that recycling program administrators and property managers cannot. It is implied by the definition of referent power that tenant volunteers should distribute.

Tenants' recycling behavior is most likely to change if all three stakeholders fill the position of distributor together. However, if that is not possible, the role of distributor should be filled in accordance with the following prescription. First, the principle of interpersonal power implies that property management as distributor would result in the highest chance of an increase in participation in recycling. MFD property management owns two of the three major types of power, legitimate and coercive, and can send messages about injunctive norms. The Aceti Associates (2002) bolster this claim with their finding that manager commitment (motivation, direct participation, and interest) correlates with tenant participation. Next, the literature implies fellow tenants' referent power would make them good distributors. Their use of referent power and ability to provide descriptive as well as injunctive norms is

extremely beneficial. Recycling program administrators are least likely to alter tenants' recycling behavior because legitimate power, their only claim, wavers. Both MFD management and fellow tenants own power that is much more promising.

### B. Obtainment

Method of obtainment is defined as the way in which recycling containers come into the possession of tenants. Terminology should be quickly addressed. The word 'obtainment' is used as opposed to 'delivery' in light of this study's emphasis on the end consumer and the goal of fundamentally changing their behavior. Obtainment values the way in which tenants receive containers. Contrary, forgoing any afterthought to continued use of the container, delivery incorrectly places emphasis on the easiest, most cost effective method of provision. With such an importance, obtainment is a criterion of distribution. Three factors are critical to obtainment: 1) format of obtainment 2) time of obtainment, and 3) personalization. Table 3.5 depicts the various ways a tenant might obtain a recycling container.

**Table 3.5 – Various Methods of Recycling Container Obtainment**

| Format of Obtainment | Time of Obtainment | Personalization |
|---|---|---|
| Mass Distribution | In the Unit before Moving In | Personal |
| Mass Distribution (w/ supplemental distribution) | When Moving In | Impersonal |
| Redeemable Vouchers | Various Times | |
| New Tenants | | |
| By Request Only | | |

Some recycling programs perform mass distributions of personal recycling containers to all MFD units and others distribute to all units with a periodic supplemental distribution for lost, missing, or stolen containers. Other recycling programs distribute redeemable recycling container vouchers through mail or email while others distribute recycling containers when new tenants arrive. Newcomers often create problems when a property is attempting to maintain a recycling culture. Thus, the new tenant option is advantageous when one considers the notoriously high nature of turnover rates at MFDs (Chamberlain 2008). Finally, a 'by request only' format of obtainment may be selected.

Next, recycling program administrators must decide when the containers are obtained. Some programs place containers in the units before tenants arrive, others manage obtainment by providing containers when a new tenant moves in, or containers are distributed at various times. Administrators

should seek to distribute containers to tenants as soon as possible to ensure the highest probability of compliance.

Last, apart from the aforementioned methods, distribution can occur personally or impersonally. It is known that humans are more likely to change their behavior in response to direct appeals from other humans (McKenzie-Mohr 2011). Personal distribution affords personal communication; thus, it is implied that personal container distribution is more likely to enhance behavior change efforts.

Recycling practices are highly habitual; disrupting a strong non-recycling habit necessitates a change in the environment (Thomas and Sharp 2013). In essence, changing the environment is the same as changing the way recycling decisions are presented to the tenant. Container obtainment should be turned into a nudge. A nudge is "any aspect of the design of choices that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler and Sunstein 2009, 6). Hence, if every unit receives a recycling container as the default option, behavioral tendencies towards recycling would be reinforced by the implicit suggestion that the masses participate (Thaler and Sunstein 2009; Hadleman and Turner).

Furthermore, a default obtainment is likely to 'nudge' non-recyclers into recycling. Owning a recycling container could even become normalized. If containers were to be found in all units as opposed to only a fraction, peer pressure may guilt the individual without a container into obtaining one. Furthermore, all recycling containers would then be of a uniform style, color and capacity. These characteristics create a visual clue to recycle. The presence of an identical recycling container in every unit of every MFD in a city is a powerful prompt (Lane and Wagner 2013; McKenzie-Mohr 2011). Taking the format of obtainment, time of obtainment, and personalization into account, recycling containers should be personally distributed to all new MFD tenants when they move in.

### C. Pricing Scheme

Pricing scheme is a necessary criterion of distribution. Pricing scheme refers to the method of financing recycling containers. Any one of the stakeholders may pay – local city government, MFD

property management, or tenants – as well as a non-stakeholder, the contracted recycling hauler. Table 3.6 presents the various pricing schemes for personal MFD recycling containers.

**Table 3.6 – Various Pricing Schemes for Personal Recycling Containers**

| |
|---|
| Tenants Pay – Rental Agreement |
| Tenants Pay – Garbage & Recycling Bill |
| Local Government Pays |
| Property Management Pays |
| Recycling Hauler Pays |
| City, Property Management, Hauler Pays Subsidy / Tenant Pays Subsidized Fee |

Tenants could pay for their own recycling containers, local governments could pay, property management could pay, or the contracted recycling hauler could assume responsibility for container payment. Further, any one of these could pay a subsidized portion of the fee and the tenant would pay the rest. This list is not exhaustive and pricing schemes will greatly vary from program to program.

When approached with the decision to purchase a container, it is suggested that tenants will quickly consider the costs and benefits of that purchase (Thaler and Sunstein 2009). Tenants' motivation to follow through with the purchase is then based upon their expectation that the benefits of owning a recycling container will exceed the cost. However, sustainable behavior, recycling in particular, is noted as being an investment good, and investment goods take time to accrue value (Thaler and Sunstein 2009). Two factors act against the ability of tenants to connect their recycling behavior with long-term results. First, benefits from recycling accrue so slowly that they may never be observed, and second, because of this slow accrual, there exists no prompt feedback to reinforce behavior. Asking a tenant to voluntarily expend resources without receiving any benefits may demotivate recycling behavior (Shrum, Lowery and McCarty 1994).

Social behavior modification tools bolster the use of a pricing scheme in which the tenant does not have to pay. A free pricing scheme is ideal because it overcomes the previously mentioned transaction costs that deter container purchase – another nudge into recycling behavior. In the same vein, free pricing schemes have been associated with higher participation rates (Lane and Wagner 2013; Folz 1991; Noehammer and Byer 1997; Curnow and Hinchy 1993). Providing containers for free would bolster the

injunctive norm that tenants should recycle. Being told to recycle, then given a free container, would communicate to the tenant the recycling program's commitment to eliciting participation.

### III. Conceptual Framework

This research attempts to create a practical ideal model for the design and distribution of personal recycling containers to multifamily dwelling (MFD) tenants. Without a pre-existing ideal model to guide the provision of personal recycling containers, best practices must be identified. In Chapter 2, the barriers to participation in recycling at MFDs and a strategy to overcome those barriers were identified. Chapter 3 presented the components of the design and distribution of personal recycling containers, and, within those components, defining criteria were established.

Table 3.7 contains a roadmap of this research thus far – the conceptual framework. The left column holds the two components of provision: design and distribution. Design is further divided into five criteria: capacity (1) addresses size, message (2) and color (3) address appearance, and material (4) and handles (5) address features. Distribution is divided into three criteria: (1) distributor, (2) method of obtainment, and (3) pricing scheme. The column on the right provides literature to support claims made in corresponding cells in the left column.

**Table 3.7 –Conceptual Framework**

| Descriptive Components and Criteria | Literature |
|---|---|
| **1.1 Design (size)** | |
| a. Capacity<br><br>Personal MFD recycling containers should be from 5-13 gallons. | EPA 1997<br>EPA 2011<br>Lane and Wagner 2013<br>Lease 2001<br>National Multihousing Council 2012<br>US Census Bureau 2013<br>Wood 1991<br>WRAP 2010 |
| **1.2 Design (appearance)** | |
| b. Message<br><br>Messages should be printed directly on the sides of MFD recycling containers.<br>Messages should be clear and easy to decipher.<br><br>Messages should be identical throughout the area that the recycling program encompasses. | Aceti Associates 2002<br>Boisclair 2010<br>Chamberlain 2008<br>City of Beaverton 2012<br>Chappells and Shove 1999<br>McKenzie-Mohr 2011<br>Olsen et al. 2010<br>Thomas and Sharp 2013<br>Zaletnik et al. 2004 |

| | |
|---|---|
| These messages should contain at least:<br>1) what can/cannot be recycled<br>2) how to recycle<br>3) where to recycle items that are not accepted by the<br>   contracted recycling hauler, and<br>4) contact information (local gov't administrator's or<br>   other relevant sources')<br><br>Pictures and graphics should be primarily used to communicate, but text in local languages should be included as well. | |
| c. Color<br><br>Recycling containers should be blue unless localized culture or norms indicate another color. | Boisclair 2010<br>Chappells and Shove 1999<br>Lane and Wagner 2013<br>Montazeri, et al. 2012 |
| **1.3 Design (utilitarian features)** | |
| d. Form<br><br>If soft shell tote bags are chosen, woven polypropylene should be used.<br><br>If hard shell bins are chosen, rigid plastic should be used. | Lane and Wagner 2013<br>Quinn 2013<br>Zaletnik et al. 2004 |
| e. Handles<br><br>No matter to the chosen form, handles should be designed into recycling containers.<br><br>If a tote bag is chosen, a handle should be sewn onto the bottom of the bag. | Boisclair 2010<br>City of Beaverton 2012<br>Zaletnik et al. 2004 |
| **2.1 Distribution** | |
| a. Distributor<br><br>All three MFD stakeholders (property management, tenants, and recycling program administrators) should distribute recycling containers to MFD tenants together; otherwise, property management should fulfill the role first, tenants second, and recycling program administrators third. | Aceti Associates 2002<br>DeVito 2008<br>Thomas and Sharp 2013 |
| b. Method of Obtainment<br><br>Recycling containers should be personally distributed to all new MFD tenants when they move in. | Aceti Associates 2002<br>Chamberlain 2008<br>Lane and Wagner 2013<br>McKenzie-Mohr 2011<br>Thaler and Sunstein 2011<br>Thomas and Sharp 2013 |
| c. Pricing Scheme<br><br>MFD tenants should not have to pay for their own personal recycling containers; other methods of financing should be utilized. | City of Beaverton 2012<br>Curnow and Hinchy 1993<br>Folz 1991<br>Lane and Wagner 2013<br>Noehammer and Byer 1997<br>Thaler and Sunstein 2011 |

# CHAPTER 4 - METHODOLOGY

## Introduction

The previous chapter sought to form the components of the design and distribution of personal recycling containers for MFD tenants. Within these components, best practices were established to create the provisional model. In order to ensure the validity of this model, the knowledge of those who have experience in the provision of MFD recycling containers should be sought. Those who are known to have experience are recycling program administrators in the public realm – the search will begin with these individuals. The purpose of this chapter is to present the research methodology used to describe the opinions of those who have participated in the design and distribution of personal recycling containers for MFDs in the United States and Canada. Participants' opinions will be used to either confirm or deny the best practices identified in the literature.

## Method of Data Collection

A survey will be used to collect data on recycling program administrators' opinions towards best practices in the design and distribution of personal MFD recycling containers. Surveys are particularly useful when attempting to capture an individual's attitude (Babbie 1999). This method of data collection is selected for four reasons. First, surveys allow researchers to depict concrete as opposed to abstract concepts (Babbie 1999). Concrete concepts are more difficult to misinterpret, meaning each respondents' interpretation of a concept deviates relatively less to the actual meaning the survey designer originally applied. This research seeks to produce a practical ideal model. While practical ideal models are themselves open to revision, their depiction is nonetheless very specific and should leave no doubt to chance. Thus, the suggestions this research presents for each component need to be very specific. Surveys afford this specificity.

Second, surveys afford researchers the ability to ask respondents questions in standardized formats with each respondent receiving exactly the same presentation and degree of context as any other

respondent. The validity of a best practice 'trend' necessitates this equality and consistency in data form. Hence, a standardized presentation affords this equality and consistency, ultimately providing the researcher "…data in the same form from all respondents." (Babbie 1999, 234)

Third, closed-ended questions further facilitate the creation of a practical ideal model. The literature review was the initial act of deduction, reducing the various possible practices into a 'finalized set,' of which the survey responses will agree or disagree as being a best practice (Babbie 1999). However, this pigeonholing could possibly alienate respondents who suggest different responses than what choices are available on the survey (Babbie 1999). Consequently, a weakness of the survey method is the possibility that a respondent may not find his or her idea of best practice an option. Here, this concern is relevant in that the 'finalized set' of best practices presented in this survey were gathered from a scant amount of MFD recycling literature, meaning it is possible that a respondent's idea of a best practice may not be an option. In order to skirt this issue, the survey will provide a number of 'open-comment' and 'other' options.

Fourth, surveys are good vehicles for collecting attitudes from people whom cannot be observed directly (Babbie 1999). In this instance, participants' geographic locations vary and are often unknown, necessitating the use of a judgment as well as a snowball sampling method. As well, in light of the time and fiscal constraints of this project and the inhibiting fact that the unit under analysis is difficult to identify, web-based surveys make more sense.

**<u>Design and Sampling Frame</u>**

A nonrandom judgment sample selection procedure was initially used to identify the sampling frame. Judgment samples are utilized when it is essential to represent a subset of the population (Johnson 2010). Thus, units are admitted into the sampling frame upon the basis that they meet specific criteria of the subgroup under analysis. Here, the criteria that must be met to enter the subgroup is being one with knowledge of container design and distribution who also works in or with local governmental

organizations to provide MFD tenants with recycling containers. Without literature or preexisting lists of those individuals, this sample was identified through the following procedures.

Individuals were first identified through an Internet search for qualifying programs. Second, email addresses were extracted from an International City/County Management Association (ICCMA) database and each organization on the list was emailed to discover 1) if that city/county offered or mandated MFDs receive on-site recycling services and 2) if personal recycling containers were a part of those services. Next, California, New Jersey, and Connecticut's state environmental management agency websites were found to offer lists of the municipal solid waste (MSW) directors from each city within the respective state. Cities above the 60,000-population threshold were then extracted from these lists. Those cities were contacted to understand whether any city employees could participate in the survey.

As well, five organizations that are associated with recycling were identified online, some non-profit and some for-profit. One example is Recycle Me Iowa, a company that caters recycling services to MFD properties. These organizations were also contacted in further attempts to identify individuals who could participate in the survey. As well, the Keep America Beautiful, Keep California Beautiful, and Keep Texas Beautiful organizations were contacted with the same purpose.

Finally, snowball sampling was used in each one of these processes. Snowball samples are used when it is unclear whom to include in the sample; so, researchers rely those who would most likely have the information to reference others (Johnson 2010). Every contact, including those failing to qualify for the sample, were solicited to discover if they knew of other programs or individuals who could participate in the survey.

**<u>Procedures</u>**

For the most part, descriptive statistics will be used to summarize the data obtained from the survey. However, several survey questions have options for 'open comments' or 'other,' with a comment section following for the response. A content analysis will be used to analyze these answers.

## Operationalization Table

Table 4.1 presents the operationalization of the concepts identified in the conceptual framework. The 1st column presents the components design and distribution as well as their defining criteria. The 2nd column operationalizes the imperative statements presented in the conceptual framework into a measurable format. Finally, the 3rd column lists the format in which answers will be recorded.

**Table 4.1 – Operationalization Table**

| Design and Distribution of Personal Recycling Containers to MFD Tenants | | |
|---|---|---|
| Categories of Analysis | Measurement | Evidence |
| **Design** | | |
| a. Capacity | Please specify the most ideal recycling container capacity (measured in gallons) to accommodate a single MFD unit with 1 - 4 occupants (enter a number or range of numbers). Please enter dimensions if you do not know the gallon measurement. | Enter an Amount |
| | If you wish, please record your comments on the issue of 'Capacity.' | Open Comment |
| b. Message | All recycling messages (labels, signs, symbols) should be identical within the area that an MFD recycling program encompasses. | Agree/Disagree |
| | Educational and informational recycling messages have the most effect on tenant's behavior when they are clear and easy to decipher. | Agree/Disagree |
| | Educational and informational recycling messages have the most effect on tenant's behavior when presented primarily through pictures and graphics (as opposed to text). | Agree/Disagree |
| | Educational and informational recycling messages should be provided in the local languages (in support of the pictures and graphics). | Agree/Disagree Open Comment |
| | An ideal method to non-verbally communicate educational and informational recycling messages to tenants (i.e. the method that would have the most effect on their recycling behavior) is to print messages directly on the sides of recycling containers. | Agree/Disagree |
| | Educational and informational messages on the sides of recycling containers should communicate HOW to recycle. | Agree/Disagree |
| | Educational and informational messages on the sides of recycling containers should communicate what CAN and CANNOT be recycled. | Agree/Disagree |
| | Messages on the sides of recycling containers should provide information on where to recycle items that are NOT accepted by the contracted recycling hauler. | Agree/Disagree |

| | Messages on the sides of recycling containers should provide contact information for the local recycling program administrator or other relevant sources. | Agree/Disagree |
|---|---|---|
| | If you wish, please record your comments on the following aspects of 'Message' on the recycling container. | Open Comment |
| c. Color | When considering a color that will elicit a response to recycle, what color is ideal for personal MFD recycling containers? (please specify) | Open Comment |
| | Why did you choose the color you provided in Question 13? | Open Comment |
| | If you wish, please record any further comments on the issue of recycling container 'Color.' | Open Comment |
| d. Form | If a soft material is chosen for personal recycling containers at MFDs, what material is most ideal? | Multiple Choice |
| | If a hard material is chosen for personal recycling containers at MFDs, what material is most ideal? | Multiple Choice |
| | What form of recycling container is ideal for personal use by MFD tenants? | Multiple Choice |
| | If you wish, please record any further comments on the issue of 'Form' of recycling containers. | Open Comment |
| e. Handles | Handles should always be a feature of personal recycling containers (no matter if using a hard or soft material). | Agree/Disagree |
| | If a tote bag (soft material) is chosen, a handle should be sewn onto the bottom of the bag for use when emptying contents into the larger, communal roll carts or recycling dumpster. | Agree/Disagree /I don't know |
| | If you wish, please record any further comments on the issue of recycling container 'Handles.' | Open Comment |
| **Distribution** | | |
| a. Distributor | Ideally, all three MFD recycling stakeholders (property management, fellow tenant volunteers, and recycling program administrators) should act TOGETHER to distribute recycling containers to MFD tenants. | Agree/Disagree |
| | If your opinion, which of the following stakeholders has the most impact on tenants' recycling behavior? | Multiple Choice |
| | Please rank order (1 = most desirable) the desirability of the following potential distributors of recycling containers. | Rank Order |
| | If you selected Other on Q#25, please specify who the other distributor should be. | Open Comment |
| | If you wish, please record any further comments on the issue of recycling container 'Distributor.' | Open Comment |

| b. Method of Obtainment | MFD tenants should ideally obtain recycling containers in what format? | Multiple Choice |
| | MFD tenants should ideally obtain recycling containers at what point in time? | Multiple Choice |
| | Which format of obtaining recycling containers has the most positive effect on tenant's recycling behavior? | Multiple Choice |
| | If you wish, please record your comments on the issue of the 'Format of Obtaining' recycling containers. | Open Comment |
| c. Pricing Scheme | MFD tenants should NOT have to pay for their personal recycling containers. | Agree/Disagree |
| | Who should pay for MFD tenants' personal recycling containers? | Multiple Choice |
| | If you wish, please record your comments on the issue of recycling container 'Pricing Scheme.' | Open Comment |
| a. Program Info | In your opinion, what is the purpose of distributing personal recycling containers? | Open Comment |
| | Please provide any information you wish you would have known when just starting your MFD recycling program - information that you think an entity embarking on a MFD recycling program would want to know. | Open Comment |
| | If you experienced issues or problems in the provision of personal recycling containers to MFD tenants, please explain in detail 1) what the issue was and 2) how it was solved. | Open Comment |
| | In your judgment, do you think any of the criteria of Design (Capacity, Message, Colors, Handles, and Form) need to be removed, or another criterion to be added for a suggestive model of personal recycling containers for MFD tenants? | Open Comment |
| | In your judgment, do you think any of the criteria of Distribution (Distributor, Method of Obtainment, and Pricing Scheme) need to be removed, or another criterion to be added for a suggestive model of personal recycling containers for MFD tenants? | Open Comment |
| b. Demographics | Please indicate your state / province. | Open Comment |
| | Please indicate what type of entity you are (city, county, province, district, contacted hauler etc.). | Open Comment |
| | Please indicate the population of your entity. | Open Comment |
| | How many years has your entity practiced the provision of MFD recycling containers? | Open Comment |
| | Does your state/county/city mandate (directly or indirectly) that MFDs (any definition of MFD will do) supply recycling services to tenants? | Open Comment |

# CHAPTER 5 - RESULTS

This study's questionnaire was open for one month. In total, about 70 entities were identified as meeting the necessary criteria and were contacted at least once with an invitation to take the survey. Within these entities, survey participants were required to have an intimate knowledge of the design and distribution of personal recycling containers to MFD tenants. Fifty-one individuals completed the survey, giving this research a 72.8% response rate. A sample size of 51 is found to be adequate in light of the following considerations. In order to determine the adequacy of a sample size, Johnson (2010) suggests examining 1) the size of the population subset, 2) confidence that the sample represents that population subset, and 3) the validity of estimates (Johnson 2010). Considering the degree of difficulty in identifying possible participants for this survey, it is assumed the population subset is not much larger than the 70 identified organizations. This sample is found to be adequate. Furthermore, a thirty percent response rate is considered average, but a sixty-percent-or-above rate is ideal. This study obtained a large enough sample to be considered externally valid.

This chapter contains the results of the questionnaire that was presented in the previous chapter under the title Operationalization Table (Table 4.1). Here, results are organized in the same format as the operationalization table with the design and distribution listed first, their criteria second, and the questions that specifically relate to each criterion third. All answers to open-ended questions are provided in the appendix of this study.

Table 5.1 presents a summary of questions that were answered in the format 'Agree/Disagree.' The far right column contains the questions as they appeared in the survey. The second column (n) contains the total number of participants who responded to the corresponding question. The third and fourth columns contain the percentage of respondents who agreed and the percentage that disagreed.

**Table 5.1 – Agree/Disagree Questions**

| Questions | n | % Agree | % Disagree |
|---|---|---|---|
| 3. All recycling messages (labels, signs, symbols) should be identical within the area that an MFD recycling program encompasses. | 51 | 96.1% | 3.9% |
| 4. Educational and informational recycling messages have the most effect on tenant's behavior when they are clear and easy to decipher. | 51 | 100.0% | 0.0% |
| 5. Educational and informational recycling messages have the most effect on tenant's behavior when presented primarily through pictures and graphics (as opposed to text). | 51 | 100.0% | 0.0% |
| 6. Educational and informational recycling messages should be provided in the local languages (in support of the pictures and graphics). | 51 | 94.0% | 6.0% |
| 7. An ideal method to non-verbally communicate educational and informational recycling messages to tenants (i.e. the method that would have the most effect on their recycling behavior) is to print messages directly on the sides of recycling containers. | 51 | 84.3% | 15.7% |
| 8. Educational and informational messages on the sides of recycling containers should communicate HOW to recycle. | 51 | 62.0% | 38.0% |
| 9. Educational and informational messages on the sides of recycling containers should communicate what CAN and CANNOT be recycled. | 51 | 84.3% | 15.7% |
| 10. Messages on the sides of recycling containers should provide information on where to recycle items that are NOT accepted by the contracted recycling hauler. | 50 | 36.0% | 64.0% |
| 11. Messages on the sides of recycling containers should provide contact information for the local recycling program administrator or other relevant sources. | 49 | 85.7% | 14.3% |
| 20. Handles should always be a feature of personal recycling containers (no matter if using a hard or soft material). | 48 | 91.84% | 8.16% |
| 21. If a tote bag (soft material) is chosen, a handle should be sewn onto the bottom of the bag for use when emptying contents into the larger, communal roll carts or recycling dumpster. | 46 | 69.6% | 4.4% |
| 23. Ideally, all three MFD recycling stakeholders (property management, fellow tenant volunteers, and recycling program administrators) should act TOGETHER to distribute recycling containers to MFD tenants. | 50 | 93.94% | 6.06% |
| 32. MFD tenants should NOT have to pay for their personal recycling containers. | 48 | 91.67% | 8.33% |

### 1.1 Design (size)

*A. Capacity*

**Table 5.2**

| Questions | n |
|---|---|
| 1. Please specify the most ideal recycling container capacity (measured in gallons) to accommodate a single MFD unit with 1 - 4 inhabitants. (enter a number or range of numbers). Please enter dimensions if you do not know the gallon measurement. | 37 |
| 2. If you wish, please record your comments on the issue of 'Capacity.' | 19 |

Table 5.2 contains questions 1 and 2 as well as the number of respondents for each question.

**1.** The average recycling container capacity for an MFD unit of 1 - 4 occupants was 8.5 gallons (see Table 5.3). Within this number, the minimum capacity was 3 gallons and the maximum was 18 gallons. While more responses were received, only 37 responses were provided in adequate, comparable formats. Five of the unusable capacities were unusually large – 30, 32-35, 65, 95, and 96 gallons. These five largest capacities were not included in the 8.5-gallon average because they fall outside of the estimated maximum capacity of 13 gallons for in-unit MFD use (see Chapter 3). While some leniency was granted above the previously estimated maximum, such that capacities falling outside of 13 gallons were included to calculate the 8.5 average (hence, the inclusion of the 14, 14, 15, 18, and 18 capacities), this leniency was not extended to all responses. It is unclear whether the participants suggesting 30+ gallon capacities failed to consider the criteria 'in-unit' or whether they were truly under the opinion that 30+ gallons would fit in an MFD unit.

**Table 5.3 – Respondent's Suggested Gallon Capacity**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | 6.3 |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 6.0 |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 6.0 |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 6.0 | 7.5 |  |  |  |  |  |  |  |  |  |
|  |  |  | 6.0 | 7.5 |  |  | 10.0 |  |  |  |  |  |  |
|  | 4.5 | 5.8 | 6.0 | 7.3 | 8.6 |  | 10.0 |  |  |  |  |  |  |
|  | 4.0 | 5.0 | 6.0 | 7.1 | 8.4 | 9.0 | 10.0 |  |  |  | 14.0 |  | 18.0 |
| 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.2 | 12.0 | 13.0 | 14.0 | 15.0 | 18.0 |

= **8.5 Gallons Average**
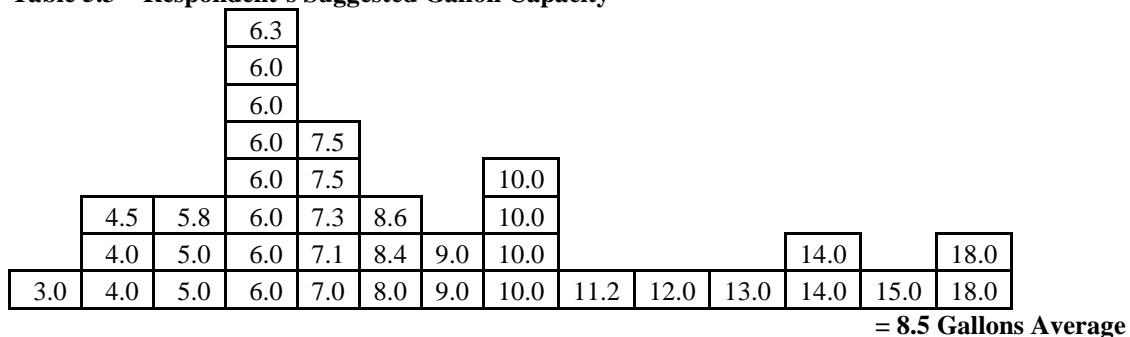
**2.** When ask to comment on the issue of capacity, 19 relevant comments were received. The majority of the comments (68%) referred to limited spaces and transportation. Due to the limited spaces

that characterize MFDs, tenants need containers with a small footprint. The criteria "small enough to fit under the sink" and "fold away when not in use" were common responses indicating capacity is a spatial issue. As well, respondents indicated that containers should be easy to transport to the central recycling area. Several participants suggested the threshold "manageable for children."

**1.2 Design (appearance)**

*B. Message*

**Table 5.4**

| Questions | n |
|---|---|
| 12. If you wish, please record your comments on the following aspects of 'Message' on the recycling container. | 34 |

Table 5.4 contains question 12 as well as the number of respondents for that question. Questions 3-11 appear in Table 5.1 at the beginning of this chapter. **3.** The majority of respondents (96.1%) agree that all recycling messages should be identical within the area that an MFD recycling program encompasses. Two respondents dissented (3.9%) and all 51 participants responded.

**4.** All respondents (100%) agree that educational and informational recycling messages have the most effect on tenants' behavior when they are clear and easy to decipher. All 51 participants responded.

**5.** All respondents (100%) agree that educational and informational recycling messages have the most effect on tenants' behavior when presented primarily through pictures and graphics (as opposed to text). All 51 participants responded.

**6.** The majority of respondents (94.1%) agree that educational and informational recycling messages should be provided in local languages (in support of the pictures and graphics). Three respondents dissented (5.9%) and all 51 participants responded.

Participants were then asked to comment on the issues questions 5 and 6 addressed. Question 5 asked participants whether pictures and graphics should be emphasized over text, and question 6 asked participants whether text in local languages should be used. Twenty-four relevant comments were received. The majority (22 respondents, 92%) simply agreed once more with their prior 'agreed' choices

in question 5 and 6. Interestingly, a large number of those agreeing indicated that pictures and graphics could possible eliminate the need for text. The respondents further bolster this notion by their assertions that graphics and pictures transcend language boundaries. The remaining 2 respondents were of the minority (8%), indicating that graphics and text contribute minimally to a program's success and should not be emphasized.

**7.** The majority of respondents (84.3%) agree that an ideal method to non-verbally communicate educational and informational recycling messages to tenants, the method that would have the most effect on their recycling behavior, is to print messages directly on the sides of personal recycling containers. Eight participants dissented (15.7%) and all 51 participants responded.

Respondents who selected 'disagree' in question 7 were then asked to describe why they selected that answer choice. Thirteen relevant comments were received and minor trends were established. Seven centered on the idea that messages on the sides of personal recycling containers should be combined with other outreach materials such as printed literature. Three brought attention to the continuity of the message. Within this concern, respondents felt if the accepted materials or the contracted hauler changes, messages could become inaccurate. Last, three remarked that people would not read the message – one respondent used the word 'passive' to describe messages printed on recycling containers. Interestingly, 13 commented when ask why they disagreed but only 8 actually dissented in question 7. What this means is that these 3 issues should be considered even if one agrees that the ideal method to communicate messages is by printing them directly on the sides of personal recycling containers.

**8.** The majority of respondents (62%) agree that educational and informational messages on the sides of recycling containers should communicate how to recycle. Nineteen respondents dissented (38%) and 50 participants responded. This is the least supported aspect of 'Message.'

**9.** The majority of respondents (84.3%) agree that educational and informational messages on the sides of recycling containers should communicate what can and cannot be recycled. Eight respondents dissented (15.7%) and all 51 participants responded.

**10.** The majority of respondents (64%) do *not* agree that messages on the sides of recycling containers should communicate where to recycle items that are not accepted by the contracted recycling hauler. Only 18 respondents agreed (36%) and 50 participants responded. This is the only aspect of 'message' in which respondents overwhelmingly disagreed.

**11.** The majority of respondents (85.7%) agree that messages on the sides of recycling containers should provide contact information for the local recycling program administrator or other relevant sources. Seven respondents dissented (14.3%) and 49 participants responded.

**12.** Respondents were then asked to comment on any of the 9 aspects of 'Message.' A total of 34 comments were received; however, respondents often commented on multiple, differing aspects of 'message.' Consequently, comments with multiple aspects were parceled. Through this analysis, 60 total responses were identified. A content analysis was then used to analyze all responses. The aspects of 'message' receiving the most commentary were 1) What can and cannot be recycled (18.3%), 2) Where to recycle unaccepted items (18.3%), 3) Contact information (18.3%), 4) 'less is more' (11.7%), 5) clear messages (10%), and 6) identical messages (8.3%).

1) 'What can and cannot be recycled' produced comments indicating that the focus should be on what *can* be recycled, meaning what cannot be recycled should be secondary information. 2) 'Where to recycle unaccepted items' was not supported. Respondents indicated that providing information external to the program - where to recycle unaccepted items - was harmful to the tenant's recycling behavior. Here, respondents suggested that an overloaded message would only confuse users who try to decipher it. 3) 'Contact information' received much support. Respondents indicated that at least a phone number and website should be included in the Message. 4) Next, a number of respondents indicated that 'less is more.' Again, respondents emphasized how small the printable area of a recycling container is and how overloading the limited space with information is harmful. 5) Similar to 'less is more' are the final two aspects: 'clear messages' and 'identical messages.' Respondents emphasized the production of clear, simple, yet consistent messages.

*C. Color*

**Table 5.5**

| Questions | n |
|---|---|
| 13. When considering a color that will elicit a response to recycle, what color is ideal for personal MFD recycling containers? (please specify) | 49 |
| 14. Why did you choose the color you provided in Question 13? | 36 |
| 15. If you wish, please record any further comments on the issue of recycling container 'Color.' | 18 |

Table 5.5 contains questions 13-15 and the number of respondents for each question. **13.** The question of an ideal color to elicit recycling behavior resulted in 49 answers. Some answers contained multiple, differing colors. Those answers containing multiple colors were parceled to produce a total of 57 responses. A content analysis was then used to analyze all responses. As Figure 5.1 depicts, 36 tallies (63.2%) indicated that the color blue is most likely to elicit a response to recycle. The only other color that received significant support was green with 7 tallies (12.3%). Similarly, Lane and Wagner (2013) also found that blue was first (51.9%) and green was second (25.5%) in their nation-wide study of general U.S. household recycling practices. Another 7 tallies (12.3%) indicated participants felt that the color of the personal recycling container should be consistent with a city's pre-existing waste management program color scheme. The remaining 12.1% were not notable.

**Figure 5.1 – What Color is Most Likely to Elicit Recycling Behavior?**
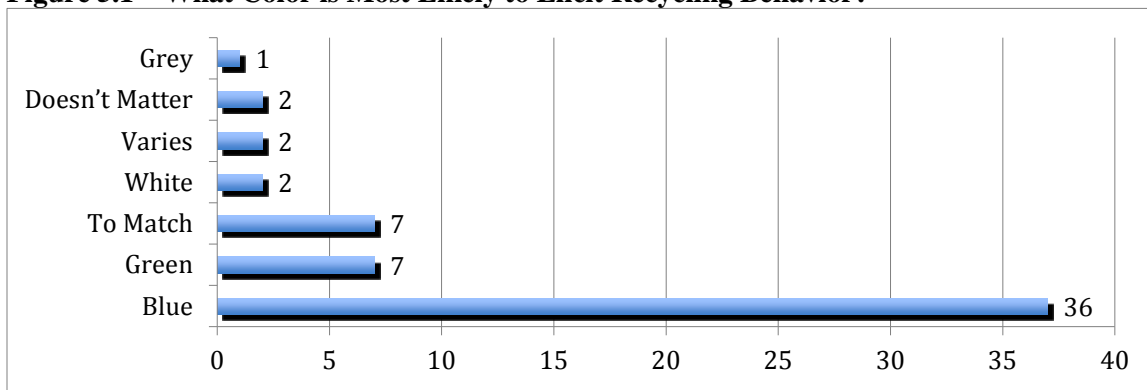


**14.** When participants were ask why they chose their color in Question 13, thirty-six comments were provided. Again, comments were parceled, leaving 38 total responses. As can be seen in Figure 5.2, a content analysis provided the following categories: 1) My Color is Standard, 2) Color should Match Pre-existing Color Scheme, and 3) Colors are Symbolic. Half (19) of the respondents felt that their color

was "default," "standard," "common," "typical," "universal," "generally associated," or "recognized" to represent recycling. Another 15 (39.5%) indicated the importance of choosing a color that matches or coincides with the pre-existing waste management program color scheme. Here, respondents indicated that the most important color to match was that of the local residential roll-cart/bin. The final 4 (10.5%) indicated that their color choice was based upon the symbolism that the color carries. All four responders indicating symbolism selected green because it represents being "green" or the environment.

**Figure 5.2 – Why Did You Choose Your Color in Question 13?**
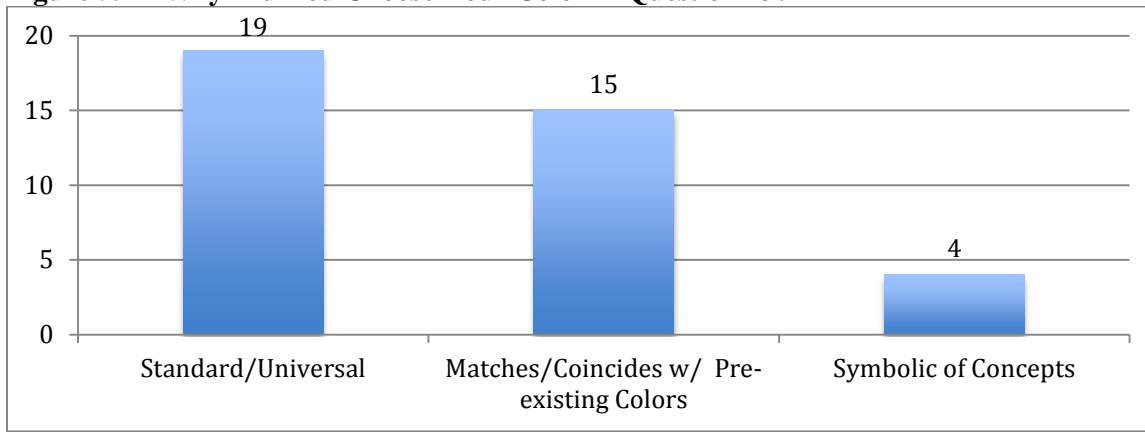


**15.** Participants were then asked to comment on the issue of Color; eighteen comments were provided. Nine respondents (50%) reiterated the idea of matching the personal recycling container color with the colors of the pre-existing recycling/solid waste program. The reason for doing this is so that all recycling carts remain consistent throughout an area. In the same vein, observations were made on how inconsistency can confuse residents. Next, two respondents (12%) indicated that an issue might arise when cities have multiple contracted haulers for recycling. Multiple contracted haulers often means various colored bins will be in use throughout the city, making it is impossible to create a single, consistent personal recycling container color. Both respondents suggested bridging this gap by using the color blue. The final 6 comments (39%) were not significant.

## 1.3 Design (utilitarian features)

*D. Form*

**Table 5.6**

| Questions | n |
|---|---|
| 16. If a soft material is chosen for personal recycling containers at MFDs, what material is most ideal? | 50 |
| 17. If a hard material is chosen for personal recycling containers at MFDs, what material is most ideal? | 42 |
| 18. What form of recycling container is ideal for personal use by MFD tenants? | 46 |
| 19. If you wish, please record any further comments on the issue of 'Form' of recycling containers. | 27 |

Table 5.6 contains questions 16 through 19 and the number of respondents for each question. **16.** Respondents were asked to suggest an ideal soft shell material for personal MFD recycling containers. Fifty participants responded; however, twenty respondents (40%) were unaware of the various soft materials available in the market for personal recycling containers, proved by their answer choice selection 'I don't know.' As well, 'polypropylene' received 20 votes (40%) and the 'other' category received 16% of the vote (8 count). However, participants failed to suggest a specific soft shell material to define 'other.' Instead, they supplied characteristics such as "washable/cleanable, durable, and waterproof." These are characteristics of polypropylene; thus, participants appear to have indirectly supported polypropylene.

**17.** When ask what material was ideal if a hard shell material was chosen for personal MFD recycling containers, 81.25% (39 votes) indicated rigid plastic to be best. Here, forty-two participants responded. Notably, respondents indicated that if a hard shell material is chosen, recycled content rigid plastic should ideally be chosen.

**18.** Participants were then asked to choose between a soft shell material (tote bag) and a hard shell material (a bin). Fifty-one participants responded and thirty-five (76.09%) indicated that the tote bag (soft shell material) is ideal for personal use by MFD tenants. Eleven respondents dissented (23.91%). These numbers are depicted in Figure 5.3.

**Figure 5.3 – What Form is Ideal for Personal Use?**



■ Tote Bag (soft material)
■ Bin (hard material)
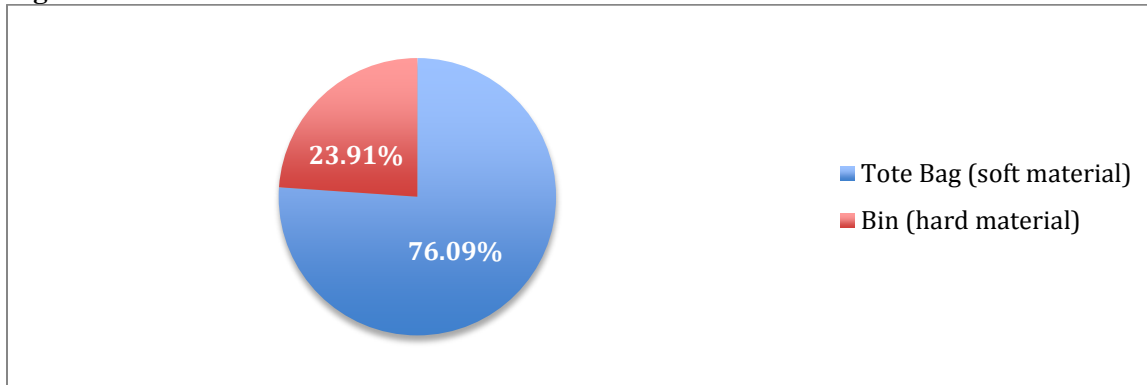
**19.** Last, participants were invited to comment on the issue of Form. Twenty-seven comments were provided. Comments were categorized into the following categories: Anti-tote/Pro-bin, Pro-tote/Anti-bin, and I Don't Know/Depends on Personal Preference. However, comments often contained elements of at least two of these categories. Those comments containing elements from multiple categories were parceled; this rendered 35 total responses. A content analysis was then used to analyze all 35 responses, producing 19 tallies (52.8%) for 'Pro-tote/Anti-bin,' 9 tallies (25%) for 'I Don't Know/Personal Preference,' and 8 tallies (22.2%) for 'Anti-tote/Pro-bin.' Trends were found in the Pro-tote/Anti-bin category. Respondents indicated that tote bags (soft shell material) are much less expensive than bins (hard shell material). They also indicated that tote bags are much more space efficient, have a smaller footprint, and are more adaptable to spaces than bins. Trends in answers for 'I Don't Know/Personal Preference' simply centered on the idea that each tenant has a personal preference. Trends could not be identified for the Anti-tote/Pro-bin category.

*E. Handles*

**Table 5.7**

| Question | n |
|---|---|
| 22. If you wish, please record any further comments on the issue of recycling container 'Handles.' | 9 |

Table 5.7 contains question 22 and the number of respondents for that question. Questions 20 and 21 are found in Table 5.1 at the beginning of this chapter. **20.** The majority of respondents (91.8%) agreed

that handles should always be a feature of personal recycling containers. Only 4 of the 48 respondents dissented (8.2%).

      **21.** Participants were asked whether a handle should be sewn onto the bottom of recycling tote bags to make it easier to empty recyclables into the larger communal roll carts or recycling dumpster – 46 participants responded. The majority of respondents (69.6%) agreed, 12 respondents (26.1%) answered 'I don't know,' and the final two respondents disagreed (4.4%). Seven respondents left 'Other' comments. These comments acknowledge the usefulness and facilitating nature of the bottom handle, but remark that they are not required.

      **22.** Participants were then ask to record any comments on the issue of recycling container 'Handles.' Nine comments were provided. Comments were categorized into the following three categories: Handles Make Transportation Easier, Bottom Handles Work, and Questions of Necessity when Using Handles on a Hard Container. However, several comments contained elements of at least two of these categories. Those comments containing elements from multiple categories were parceled; this rendered 11 total responses. A content analysis was then used to analyze all 11 responses, producing 5 tallies (45.5%) for 'Bottom Handles Work.' Here, many simply agree with the idea of attaching a handle on the bottom of tote bags. Four tallies (36.4%) were allocated to 'Handles Make Transportation Easier.' Here, respondents emphasized how handles can facilitate recycling. The final 2 tallies (18.2%) were for 'Questions of Necessity when Using Handles on a Hard Container.' Several respondents questioned the usefulness of handles on hard material containers.

## 2.1 Distribution

      *A. Distributor*

**Table 5.8**

| Questions | n |
|---|---|
| 24. If your opinion, which of the following stakeholders has the most impact on tenants' recycling behavior? | 50 |
| 25. Please rank order (1 = most desirable) the desirability of the following potential distributors of recycling containers. | 50 |
| 26. If you selected Other on Q#25, please specify who the other distributor should be. | 21 |
| 27. If you wish, please record any further comments on the issue of recycling container 'Distributor.' | 12 |

Table 5.8 contains questions 24 through 27 and the number of respondents for each question.

**23.** Respondents were asked if the three MFD recycling stakeholders (property managers, tenants, and recycling program administrators) should act together to distribute personal recycling containers. Fifty participants responded, thirty-one (93.9%) agreed, and two disagree (6.1%). When participants were asked to comment if they felt another stakeholder should be added or one removed, 17 participants responded. Of those who commented, 4 (23.5%) are under the impression that haulers should be included as a stakeholder, 4 (23.5%) believe that external volunteers should be included, and 4 (23.5%) that property managers should be the only distributors. No trends were found in the final five comments.

**24.** Respondents were then asked what stakeholder would have the most impact on tenants' recycling behavior; fifty participants responded. As can be seen in Figure 5.4, thirty-three respondents (66%) believe that property managers would have the most impact on tenants' recycling behavior. Fellow tenants are the second most likely to affect other tenants' recycling behavior with 14 votes (28%). Notably, recycling program administrators were received zero votes. The final 3 votes (6%) were votes for 'Other;' however, no trend was found within these comments.

**Figure 5.4 – Stakeholders with Most Impact on Tenants' Recycling Behavior**
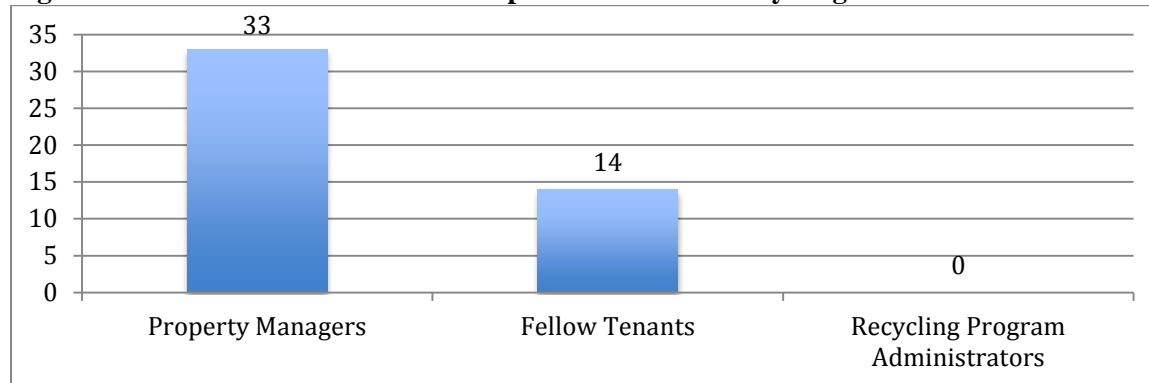


**25.** Respondents were then asked to rank order the desirability of potential distributors of personal recycling containers at MFDs. Answers were similar to the previous question. As can be seen in Table 5.9, respondents chose stakeholders in the following order: property managers, fellow tenants, recycling program administrators, and other. Fifty participants responded.

**Table 5.9 – Rank Order Desirability of Potential Distributors**

| Answer Options | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Property Managers | **38** | 6 | 6 | 0 |
| Fellow Tenants | 2 | **25** | 15 | 8 |
| Recycling Program Admin. | 10 | 14 | **22** | 4 |
| Other | 0 | 5 | 7 | **38** |

**26.** Next, respondents were asked to define the 'other' potential distributor from question 25. Twenty-one comments were provided. Comments were categorized into the following three categories: Volunteer/Non-Profits, Hauler, and Maintenance Staff. Several comments contained elements of at least two of these categories. Those comments containing elements from multiple categories were parceled; this rendered 25 total responses. A content analysis was then used to analyze all 25 responses. Figure 5.5 depicts the distribution of 12 tallies (48%) to 'Volunteer/Non-Profit,' 11 tallies (44%) to 'Hauler,' and 2 tallies (8%) to 'Maintenance Staff.' Respondents' definitions of 'Other' are very similar to respondents' definitions of 'Other' in question 23, with 'Volunteer/Non-Profit' and 'Hauler' appearing in each.

**Figure 5.5 – Define the 'Other' Stakeholder**
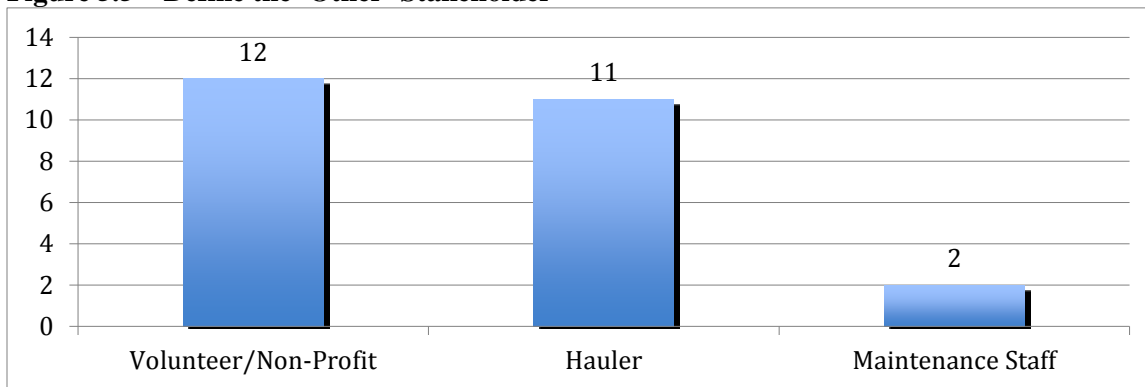


**27**. Participants were then asked to comment on the issue of recycling container 'Distributor.' Twelve participants responded. Six respondents (50%) indicated that property managements' participation is key to an MFD recycling program's success. These comments indicate that property managers who participate create "ownership" of their program. No trends could be found in the remaining 6 comments.

**Table 5.10**

| Questions | n |
|---|---|
| 28. MFD tenants should ideally obtain recycling containers in what format? | 48 |
| 29. MFD tenants should ideally obtain recycling containers at what point in time? (multiple options may be selected) | 68 |
| 30. Which format of obtaining recycling containers has the most positive effect on tenant's recycling behavior? | 48 |
| 31. If you wish, please record your comments on the issue of the 'Format of Obtaining' recycling containers. | 10 |

Table 5.10 contains questions 28 through 31 and the number of respondents for each question.

**28.** First, respondents were asked to select an ideal format of distribution – 48 participants responded. The various formats to choose from included Mass Distribution (1 time), Mass Distribution with Supplemental Distribution for Missing or Stolen Containers (1+ times), Redeemable Vouchers, New Tenant Status, By Request Only, and Other. Many suggested a combination or formats when commenting on 'Other.' Thus, this question is analyzed in two separate instances. First, all formats of distribution are analyzed together. Second, the category 'Other' is analyzed alone.

First, considering all formats of distribution, the categories receiving the highest number of votes were 'Mass Distribution with Supplemental Distribution for Missing or Stolen Containers (1+ times)' with 13 votes (27%) and 'New Tenant Status' with 13 votes (27%).' Third was 'Other' with 11 votes (23%), fourth was 'Mass Distribution (1 time)' with 9 votes (19%), fifth was 'By Request Only' with 2 votes (4%), and lastly, 'Redeemable Vouchers' received zero votes. This distribution is depicted in Figure 5.6.

**Figure 5.6 – Formats of Distribution**
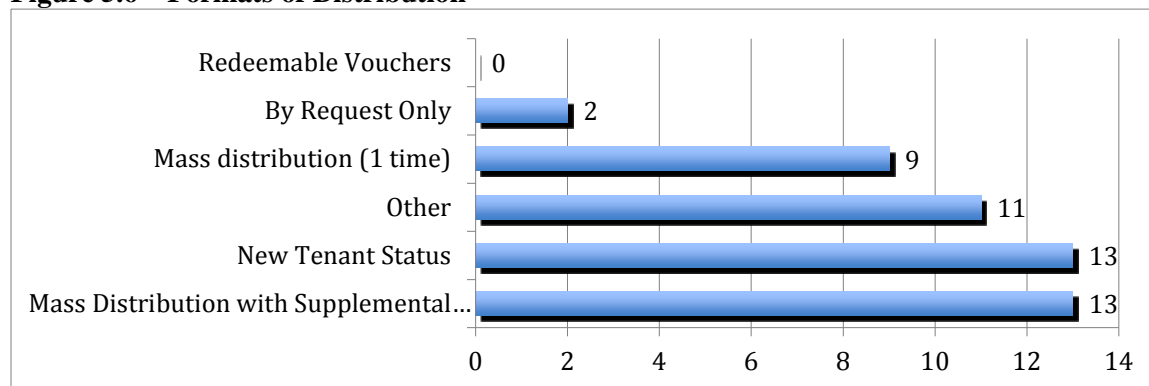
Second, eleven respondents selected 'Other' as depicted in Figure 5.7. Here, respondents suggested combined formats as ideal. Categories of combined formats were found to be 'Mass Distribution with Supplemental Distribution for Lost, Stolen, or Missing Containers (1+ times) *and* New Tenants,' 'Mass Distribution (1 time) *and* New Tenants,' and a 'Miscellaneous' category.

**Figure 5.7 – 'Other' Combined Formats of Distribution**



The distribution of combined votes matters for the following reason. One respondent, commenting in 'Other,' remarked that this was a "Flawed question. Need to be able to choose multiple items in this one." The respondent is correct. Here, the ability to choose multiple answer choices would have been ideal; however, trends can still be gained from the available data.

If one were to look at the categorical descriptions of the combined formats of distribution (Figure 5.7), the most typical format is 'Mass Distribution (1+ times) + New Tenants' (54.5%). Similarly, the most typical formats found in Figure 5.6 (non-combined formats) are 'Mass Distribution (1+ times)' and 'New Tenant arrivals.' In lieu of the respondents' inability to select multiple formats of distribution in the latter instance, the consistency in respondents' answers across multiple questions suggests that a combined format of distribution is ideal.

**29.** Apart from format of distribution, participants were asked at what point in time tenants should ideally obtain containers. Here, respondents were allowed to select multiple options if they chose – this produced 68 total votes. Here, it was assumed that tenants should be offered multiple points in time to obtain containers. As depicted in Figure 5.8, the category receiving the greatest percentage (52.9%) was 'When moving in' with 36 tallies. Next was 'Containers should be in the unit before tenants

are moved in' with 15 tallies (22.1%). Third was 'At various times' with 13 tallies (19.1%) and fourth was 'Other' with 4 tallies (5.9%). The 4 respondents selecting 'Other' remarked that, ideally, property managers would verbally introduce the program to tenants as they arrive for move-in. One respondent goes as far to say that their program requires property managers to provide a "…written notice (tenant needs to sign it [to show] they read it), explaining why [to recycle], what items must be recycled, and how to recycle at the complex."

**Figure 5.8 – When Should Tenants Obtain Recycling Containers?**
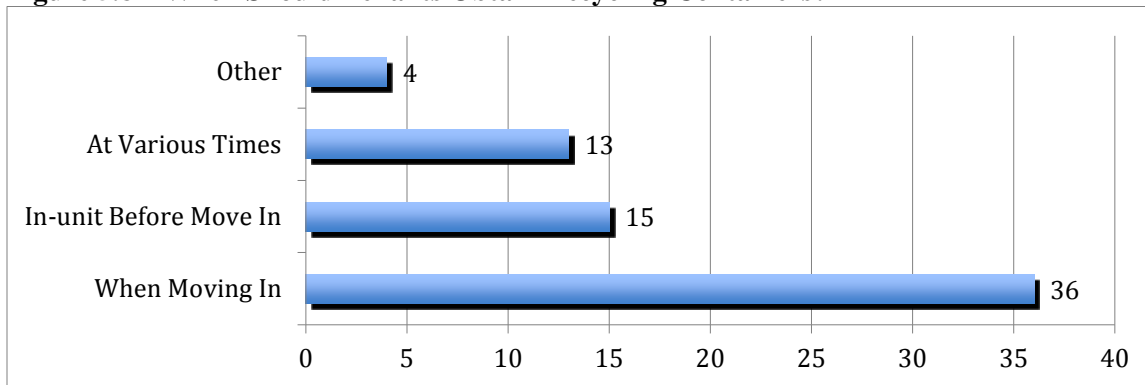


**30.** Overwhelmingly, 47 of 48 respondents (97.9%) felt that a personal format of recycling container obtainment was ideal. Only one respondent dissented.

**31.** Participants were then asked to comment on the issue of 'Format of Obtaining' recycling containers. Ten respondents commented and a trend was found through seven of these comments. Similar to the commentary in question 29 and answers in question 30, respondents remarked once more on the importance of having the property manager present the recycling program to new tenants, how this effectively "sets the norm," and how the "personal" aspect of obtainment is important. No trends were found through the final 3 comments.

*C. Pricing Scheme*

**Table 5.11**

| Questions | n |
|---|---|
| 33. Who should pay for MFD tenants' personal recycling containers? | 47 |
| 34. If you wish, please record your comments on the issue of recycling container 'Pricing Scheme.' | 13 |

Table 5.11 contains questions 33 and 34 and the number of respondents for each question. Question 32 appears in Table 5.1 at the beginning of this chapter. **32.** Respondents overwhelmingly agreed (91.7%) that tenants should not have to pay for their personal recycling containers. Forty-eight participants responded and four dissented (8.3%).

**33.** Participants were then asked who should pay for recycling containers instead of tenants. A total of 47 participants responded. As can be seen in Figure 5.9, the two categories receiving the highest number of votes were 'Local Government Pays' with 13 votes (27.7%) and 'Recycling Hauler Pays' with 11 votes (23.4%). Next was 'Other' with 10 votes (21.3%), then 'Tenant Pays – Fees built into tenants monthly garbage and recycling bill' with 5 votes (10.6%), and 'Tenant Pays – Fees built into rental agreements' with 4 votes (8.5%). The final two categories, 'Property management should pay' and 'City, property management, or hauler should pay subsidy/tenant should pay subsidized fee' only received 2 votes each, or 4.3% apiece.

**Figure 5.9 – Who Should Pay for Personal Recycling Containers at MFDs?**
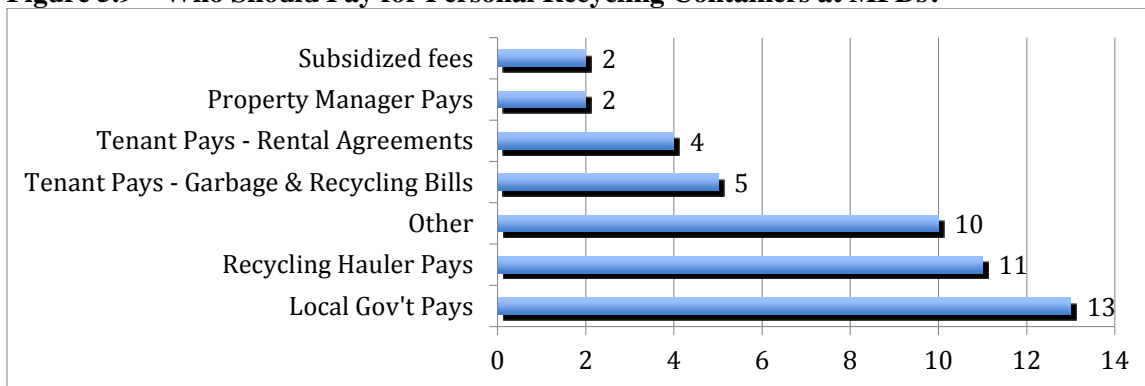


However, after comparing responses from question 32 and 33, further investigation is warranted. First, 4 respondents indicated in question 32 that tenants should have to pay for their own personal recycling container. Oddly, this number does not match the numbers presented in this question (Figure 5.9). Here, a total of 9 (4+5) believe that tenants should pay. Second, within 'Other' on question 33, respondents' comments seem to suggest that a combination of payees is ideal. Of the ten responses, 4 indicated that the Local Government *and* the Haulers should split the cost and 2 respondents remarked

that the first personal recycling container should be free, but that a deposit should be made for lost, stolen, or missing containers. No trends were found in the final four comments.

Now, the skeleton of a pricing scheme can be seen. Respondents indicated that tenants should not have to pay for their personal recycling container, that the local government and the recycling hauler should split the cost of the initial container, and that tenants should have to pay for the container if it is lost, stolen, or missing.

**34.** Participants were then asked to comment on the issue of recycling container 'Pricing Scheme.' Thirteen comments were received. Three respondents suggested looking for grant money to help pay for the cost of the recycling containers. Four participants emphasized once more the importance of free containers. Conversely, three respondents remarked that tenants would eventually pay for their recycling containers in one way or another. One respondent's commentary appropriately bridges these two conflicting formats, "[Make] no direct charge to tenants for containers. Make them 'free.' However, no matter which of the other options you select, the tenant will be paying for the containers indirectly in garbage and recycling bills, taxes, rent, etc." No trends could be found in the final three comments.

### 3.1 Program Information

**Table 5.12**

| Questions | n |
|---|---|
| 35. In your opinion, what is the purpose of distributing personal recycling containers? | 46 |
| 36. Please provide any information you wish you would have known when just starting your MFD recycling program - information that you think an entity embarking on a MFD recycling program would want to know. | 34 |
| 37. If you experienced issues or problems in the provision of personal recycling containers to MFD tenants, please explain in detail 1) what the issue was and 2) how it was solved. | 18 |
| 38. In your judgment, do you think any of the criteria of Design (Capacity, Message, Colors, Handles, and Form) need to be removed, or another criterion to be added for a suggestive model of personal recycling containers for MFD tenants? | 8 |
| 39. In your judgment, do you think any of the criteria of Distribution (Distributor, Method of Obtainment, and Pricing Scheme) need to be removed, or another criterion to be added for a suggestive model of personal recycling containers for MFD tenants? | 4 |

Table 5.12 contains questions 35 through 39 and the number of respondents for each question.

**35.** Participants were asked to express their opinion on the purpose of personal recycling containers. A total of 46 participants responded and a content analysis was used to categorize the comments. However, many comments contained elements of at least two categories. Comments containing elements of multiple categories were parceled; this rendered 74 total responses. As can be seen in Figure 5.10 below, this analysis produced the following results: the 'Transportation/Convenience/Storage' category received 26 tallies (35.1% of the vote), 'Education/Outreach' received 16 tallies (21.6%), 'To Encourage Recycling Behavior' received 11 tallies (14.9%), 'Increase Diversion Rate' received 9 tallies (12.5%), 'Reminder to Recycle' received 5 tallies (6.7%), 'Relate an Expectation' received 4 tallies (5.4%), 'Decrease Contamination' received 2 tallies (2.7%), and 'All Residential Homes Have them, so Apartment Tenants Should Too' received 1 tally (1.4%).

**Figure 5.10 – What is the Purpose of Personal Recycling Containers?**
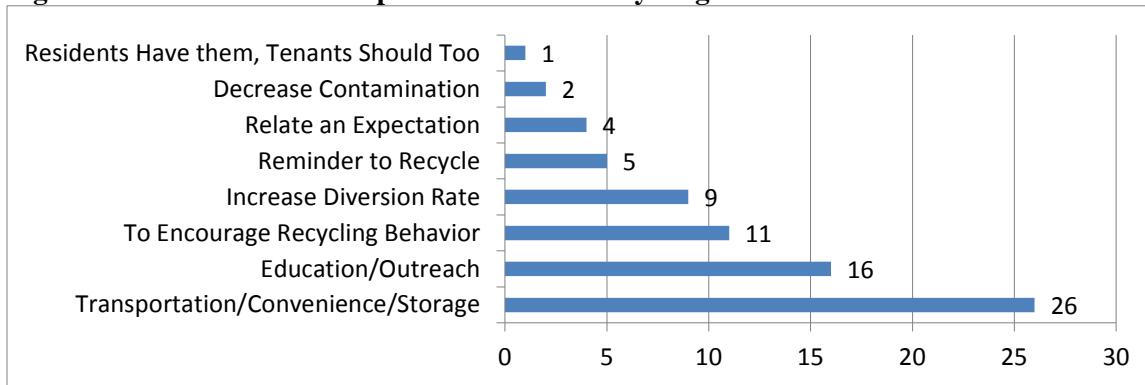


**36.** Participants were then asked to provide any information that they wish they would have known when first starting their MFD recycling program or accommodating personal recycling container provision program. Thirty-four participants commented. Again, a content analysis was used to categorize the comments. However, comments often contained elements of multiple categories. Thus, those comments were parceled to produce 74 total responses. These comments are available in their entirety in the appendix but their categorical representation is depicted in Figure 5.11.

Sixteen responses regarded 'Outreach and education.' Five responses regarded 'Reminders to recycle' and another 5 responses concerned various 'Container concerns.' Four comments indicated that

'Property managers are reluctant to help,' but that for programs to function properly, their help is needed. Four responses reemphasized 'Consistency' and another four commented on the importance of 'Relating the expectations' of those using the recycling program. Three responses suggested MFD recycling programs 'Start small and enlarge incrementally,' three related the importance of 'Annual site visits,' two suggested the 'Use of volunteers,' two suggested that 'Not all tenants want to recycle,' two discussed 'Empiricism and data collection,' two emphasized 'Communication,' two commented on 'Decrease in contamination,' and the final category, 'Do it Right from the start' emphasized the necessity of having program infrastructure in place before implementing a program.

**Figure 5.11 – Categorical Distribution of Open-ended Responses**
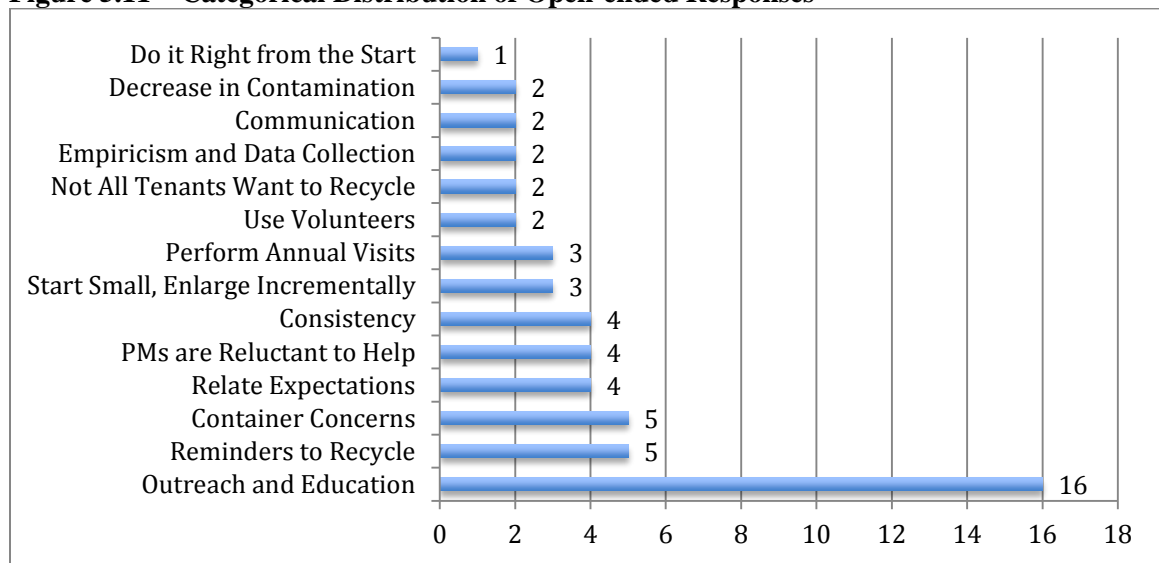


**37.** Participants were then asked to explain in detail some of the issues that arose in their provision of personal recycling containers and what solutions were implemented. These comments are available in their entirety in the appendix but their categorical representation is depicted in Figure 5.12. Five respondents addressed the issue of 'Needing to ensure distribution' of tote bags once property managers receive them. No solutions were suggested. Four respondents addressed the issue of tenants using recycling 'Tote bags for other purposes' besides recycling. No solutions were suggested. Three comments addressed the difficulties of 'Gaining access to properties and property managers.' No solutions were suggested. Another three comments commented on issues with 'Program Implementation.'

Two comments addressed the 'Expense related to tote bags.' No solutions were suggested. Two comments addressed 'What to do with uncooperative properties or property managements.' The suggested solution was to only work with properties that are agreeable. Finally, two comments suggested that 'Tote bags will be stolen/taken.' No solutions were given.

**Figure 5.12 – Categorical Distribution of Open-ended Responses**
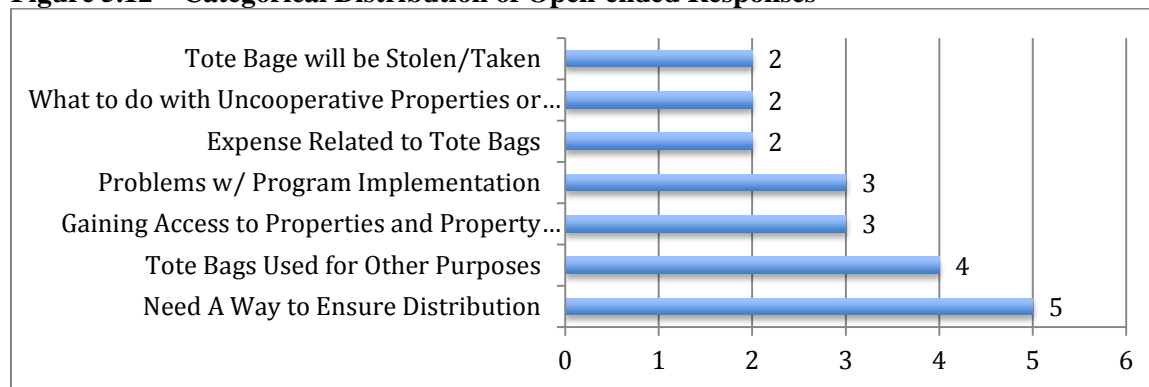


**38.** Participants were then asked whether any of the criteria of Design should be removed or a criterion added (Capacity, Message, Colors, Handles, and Form). Eight participants responded; however, no discernable trends were found in these answers.

**39.** Similarly, participants were asked whether any of the criteria of Distribution should be removed or a criterion added (Distributor, Method of Obtainment, and Pricing Scheme). Four comments were provided. Two comments were miscellaneous in nature but the final two comments suggested adding a criterion to Distribution entitled, 'Retention/Replacement.'

### 4.1 Demographics

**Table 5.13**

| Question | n |
|---|---|
| 40. Please indicate your state / province. | 48 |
| 41. Please indicate what type of entity you are (city, county, district, region, contacted hauler, etc.). | 49 |
| 42. Please indicate the population of your entity. | 41 |
| 43. How many years has your entity practiced the provision of MFD recycling containers? | 45 |
| 44. Does your state/province region/county/city mandate (directly or indirectly) that MFDs (any definition of MFD will do) supply recycling services to tenants? | 50 |

Table 5.13 contains questions 40 through 44 and the number of respondents for each question.

**40.** The state/province with the most survey respondents was California with 18 (37.5%), second was

Oregon with 8 (16.7%), third was Ontario with 5 (10.4%), fourth was Texas with 4 (8.3%), fifth was British Columbia with 3 (6.3%), sixth was Florida with 3 (6.3%), seventh and eighth were Iowa and Minnesota with 2 a piece (4.2% each), and ninth, tenth and eleventh were Illinois, Washington state, and Wisconsin with 1 vote apiece (2.1% each). Figure 5.13 illustrates this distribution.

California's over-representation in this study was expected. California's Assembly Bill 341-2011 mandates that multifamily dwellings of 5 units or more arrange for recycling services. Most California respondents cited this law in email communication prior to survey distribution.

**Figure 5.13 – Distribution of Respondents' State / Provinces**
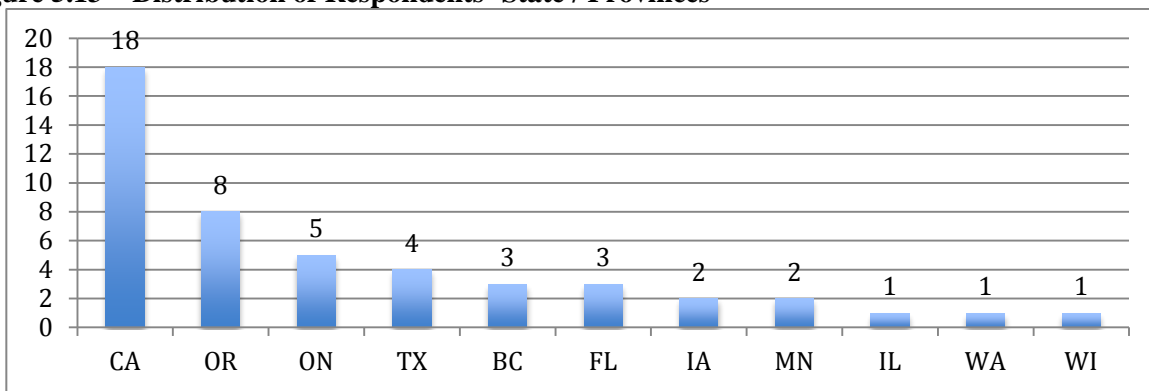


**41.** As can be seen in Figure 5.14, the 30 respondents represented a city (61.2%), while the second most represented entity was county government with 7 (14.3%). Third was recycling haulers with 5 representatives (10.2%), fourth was provincial regions with 3  (6.1%), and fifth, sixth, and seventh only had 1 representative a pieve (2% each). Here, forty-nine participants responded.

**Figure 5.14 – Distribution of Entities that Respondents Represent**
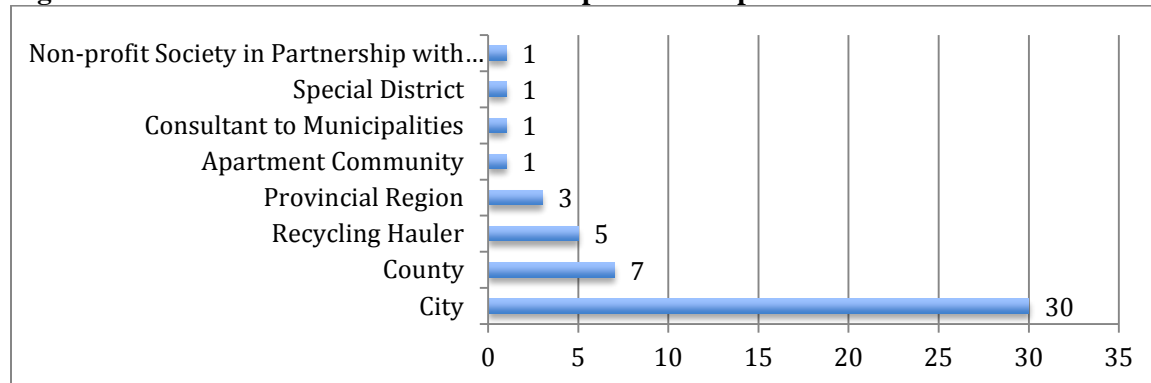
**42.** The average population of the responding entities that practice personal recycling container distribution at MFDs is 398,069 persons. Forty-one responded. However, this number is deceiving – averaging populations by entity type will present a more accurate understanding of entities that practice this activity.  As can be seen in Table 5.14, when looking at cities alone, the average population out of 26 cities is 287,736 people. When only looking at counties, the average population out of 6 counties is 793,333 people. In this survey, the lowest represented city population was 1,633 people and the highest was 2,790,000. The lowest represented county population was 160,000 people and the highest was 1,800,000.

**Table 5.14 – Average Populations (City and County)**

| **Avg. City** | 287,735.96 | | **Avg. County** | 793,333.33 |
|---|---|---|---|---|
| **Min - Max** | 1,633 - 2.79M | | **Min - Max** | 160,000 - 1.8M |

In total, 82% of the respondents in this study were from a city, county, or provincial region, meaning that the data collected is mostly from representatives of the public arena. This distinction is beneficial. Public employees may be more adept in dissecting these programs since they are more likely to have practical field-experience. As well, public employees are more likely to understand the dynamics of the relationships between tenants, property managements, government officials, and recycling haulers.

Although cities with populations below 60,000 were reported to provide personal recycling containers to MFD tenants, twenty-two of twenty-four cities that provided their populations were over the 60,000-population mark. No further notable trends were found within demographics.

**43.** The average number of years that entities have practiced the provision of personal recycling containers is 6.5 years. Here, forty-five responses were received. The distributions of respondents' answers are represented in Figure 5.15. Seventeen programs (37.8%) have been in existence for 1.1 - 5 years, while the second highest number (12 – 26.7%) have been in existence for 5.1 - 10 years. Together, these two categories hold 63.3% of the program lengths. Roughly sixty-three percent of MFD recycling programs that distribute personal recycling containers are 1.1 - 10 years old.

**Figure 5.15 – Distribution of Lengths of Program Existence**
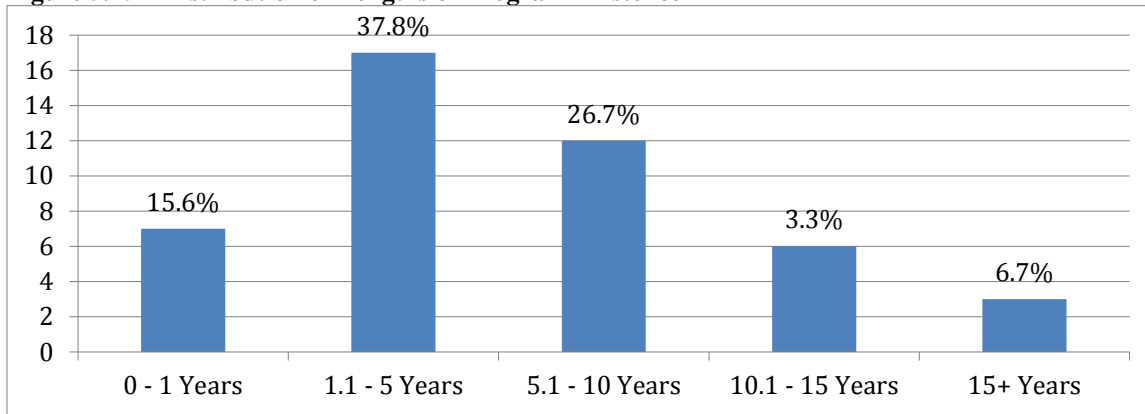


**44.** Last, the majority of the participants' states, provinces, counties, and cities mandate that MFDs provide recycling services to tenants (68%). Here, fifty responded and 16 (32%) indicated that their entity is not under a mandate. This means that two out of every three entitles that voluntarily instituted a personal recycling container provision program are located in an area where the provision of recycling services to MFD tenants is mandatory.

# CHAPTER 6 – THE PRACTICAL IDEAL MODEL

This chapter will present the practical ideal model based on the findings of this study. The 'ideal' distinction allows for the pragmatic administrator to modify the model as seen fit. The 'practical' distinction indicates the organic nature of this model; the components and criteria are developed for their usefulness and only from the best available data. Here, there is no claim to perfection (Shields & Rangarajan 2013).

Responses from Chapter 5 (Results) will be conglomerated to create a practical ideal model for the design and distribution of personal recycling containers in MFD recycling programs. In other words, this chapter will present a product – personal recycling containers – and a service – the distribution of these containers. As well, the product and service suggested by the survey results will be analyzed against the provisional model created from the literature review (Ch. 3) to understand what aspects were accurate, what was inaccurate, and what else should be altered. The outline of this chapter retains the structure that the previous chapter exhibited, with ideal criteria grouped by design first and distribution second. The practical ideal model is presented in its entirely in Table 6.1 below. Criteria appear in the left column and ideals are modeled on the right.

**Table 6.1 - Summary Table,**
**Practical Ideal Model of Personal Recycling Containers for MFD Tenants**

| DESIGN | |
|---|---|
| **Ideal Capacity** | 8.5 Gallons |
| **Ideal Message Vehicle** | The Sides of Personal Recycling Containers |
| **Ideal Message Format** | -Make all Messages in Program Area Consistent and Identical<br>-Make Messages Clear and Easy to Decipher<br>-Use Pictures and Graphics Primarily (as opposed to text)<br>-Provide Textual Messages in Local Languages |
| **Ideal Message Content** | -What Can (and Cannot) Be Recycled<br>-Contact Info. of the Local Program Authorities<br>(at least website and phone number) |
| **Possible Message Content** | How to Recycle |
| **Ideal Color** | Blue |
| **…Unless there are Pre-existing Solid Waste Colors** | Then Use the Pre-existing Solid Waste Color Scheme |
| **Ideal Form** | Soft Shell Material (tote bag) |
| **Ideal Soft Material** | Polypropylene |
| **Ideal Hard Material** | Rigid Plastic (recycled content) |
| **Ideal Handles** | Always Add Handles |
| | Ideal to Add Bottom Handles if using Soft Material (tote bag)<br>  -Not Necessary if Cost-prohibitive |

| DISTRIBUTION | |
|---|---|
| **Ideal Distributors** | All Stakeholders Acting Together is Ideal |
| **Most Influence** | Property Managers Have Most Influence On Tenants' Recycling Behavior |
| **Ideal Order of Participating Distributors** | If All Stakeholders Cannot Participate… use Distributors in this Order:<br> 1) Property Management<br> 2) Volunteers (tenant or non-tenant, i.e., non-profit)<br> 3) Recycling Program Administrators<br> 4) Recycling Haulers |
| **Ideal Format of Obtainment** | Multiple Formats of Obtainment are Best |
| | The Following Combination is Ideal…<br> 1) Distribute Containers to all MFD Tenants when Implementing Program<br> 2) Then Distribute Containers to all New Tenants<br> 3) Maintain Extras for Purchase by Tenant if Container is Lost, Stolen, or Missing |
| **Ideal Time of Obtainment** | When Tenants Arrive for Move-in |
| **Ideal Interaction** | Personal |
| **Ideal Pricing Scheme** | Tenants Do Not Pay |
| | The Following Prescription is Ideal…<br> 1) Local Government + Contracted Haulers Split Cost to Blanket Citywide MFDs<br> 2) Tenants Must Pay for Lost, Stolen, or Missing Containers<br> 3) Retention / Replacement: it is Suggested that a Deposit / Fee clause be Built into<br>             Leasing Agreements or Garbage and Recycling Services |

**1.1 Design (size)**

      *A. Capacity*

      The ideal recycling container capacity to accommodate 1 – 4 occupants is 8.5 gallons. This number is close to the center of the 5 - 13 gallon capacity range suggested in this study's provisional model. This capacity also corresponds directly with a respondent's comment – "Our bag is 8.64 gallons." The respondent further reported that, "a survey completed in 2012 showed that 79% of the bag recipients felt the size was just right, 3% felt it was too large, and 18% too small." This comment bolsters the validity of this study's 8.5 gallon finding. Theoretically, as was discussed in Chapter 3, an 8.5 gallon container would need to be emptied every .97 days with 4 occupants in the MFD, 1.3 days with 3 occupants, 1.95 days with 2 occupants, and 3.93 days with 1 occupant. Furthermore, as the provisional model suggested, personal recycling containers should be designed to fit in the under-the-sink base cabinet.

      Printing messages directly on the sides of recycling containers is an ideal method to communicate educational and informational messages to tenants. This method is ideal because it prompts tenants as close in time and space as is possible to the targeted behavior of recycling. If tenants were to keep trash receptacles *and* recycling containers beside each other under the sink, considering the messages on the side of recycling containers would then be as close to time and space as possible to the desired behavior, it would then be possible for recycling containers to prompt tenants to recycle.

      A number of respondents commented on how capacity depends on the situation. These participants suggested that capacity could vary depending upon three factors: frequency of collection service, collection format (single stream, dual stream, etc.), and the number of occupants per unit. Upon closer examination, it becomes apparent that these concerns are ill founded. Frequency of service is not a concern when utilizing the 'communal recycling area-personal recycling container' program format recommended by this study. Recycling haulers do not service in-unit containers; they service communal recycling areas. Furthermore, communal recycling areas should be ready to store at least one weeks' worth of material. Thus, personal recycling container capacity does not depend upon frequency of service.

Quite the opposite, personal recycling containers can be emptied at will. The second situation, one in which a dual or multiple recycling stream collection style is practiced, can be accommodated by the use of multiple personal recycling containers, or the design of a container with dividers. The third situation, one in which inhabitants per unit varies, should have been accommodated by this study – participants were asked the most appropriate capacity for 1 - 4 inhabitants.  However, if a situation arises in which a unit needs more than one recycling container, the proposed solution is the provision – or availability to purchase – a second or third personal recycling container.

**1.2 Design (appearance)**

*B. Message*

First, identical messages should be used because they are likely to invoke a memory of previously encountered messages, and by process of association tenants are likely prompted to act. Here, messages effectively become normalized. As well, identical messages decrease the transaction costs necessary to learn or memorize a specific recycling collection system. Second, simple and clear messages are necessary because the public can find it difficult to remember or are not aware of what to recycle. Third, graphics and pictures outweigh text because they can be interpreted much more quickly than text. Fourth, text should still be used as needed, especially if minority languages are spoken in the encompassing program area. As well, in light of the fact that pictures and graphics transcend language barriers, consider eliminating the use of text all together.

Printing messages directly on the sides of recycling containers is an ideal method to communicate educational and informational messages to tenants. This method is ideal because it prompts tenants as close in time and space as is possible to the targeted behavior of recycling, especially if recycling containers are kept under the sink in a base cabinet. Printed literature should be a secondary consideration if personal recycling containers with recycling messages are distributed. It is also important to ensure that the current contracted recycling hauler will remain in that role for an adequate period of time. If haulers change, the messages on the sides of containers may become useless. As well, respondents emphasized

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that less is more. Consider providing only what 'can' be recycled and remove what 'cannot' be recycled to save space and keep the message clear and simple.

Different from the provisional model, relating 'how to recycle' is not mandatory. Although providing information on how to recycle may help tenants, like what cannot be recycled, this message may only serve to clutter the side of the container and confuse the user. Finally, and also contrary to the provisional model, container-side messages should *not* communicate where to recycling items not normally accepted by the contracted recycling hauler. Again, this information is likely to confuse the tenant. The aspect 'How to recycle' is optional and 'Where to recycle unaccepted items' is removed as an aspect of 'Message.'

### *C. Color*

First and foremost, personal recycling containers should be blue to express its intended purpose. The color blue is most associated with recycling. However, notably, blue is not the official, universal color for recycling – an official color does not exist. Interestingly, blue has been normalized to the extent that many respondents stated with certainty that it is the universal color for recycling. This perception could prove beneficial if tenants are pre-conditioned to perceive a blue cart or container as designated for recycling.

However, personal recycling containers should match an area's pre-existing solid waste program color scheme if the colors can be duplicated. For example, if single-family dwelling (SFD) residents use green roll-carts for their curbside recycling service, then the new personal recycling containers for MFDs should be the same shade of green as well. Matched colors create consistency that should allow local tenants to determine, through association alone, that a container is designated for recycling. Inconsistent coloring is likely to confuse tenants. If s situation exists in which multiple recycling haulers are contracted throughout the MFD recycling program's encompassing area, meaning there are multiple color schemes to the pre-existing containers, the color blue should be used to bridge the gap.

### 1.3 Design (utilitarian features)

#### D. Form

The most ideal soft shell material (tote bag) is polypropylene. Polypropylene is more water resistant and dries faster than nylon or polyester. As well, polypropylene is recyclable at facilities that accept number 5 plastics. The most ideal hard shell material (bin) is rigid plastic. If rigid plastic is chosen, it is suggested that a recycled content rigid plastic material be used. If the choice is between soft or hard shell materials, a soft material (tote bag) is ideal. As was found in the literature, the survey results suggest that tote bags are much less expensive. Also, considering respondents' commentary about the tendency for personal recycling containers to be lost, stolen, or missing, a more cost-cognizant option makes sense. Last, tote bags are more space efficient, more adaptable to spaces, and have a smaller footprint than hard shell bins. As Chappells and Shove (1999) state, bin shape should be strongly linked to the physical layout of MFDs. It appears as if tote bags fit this criterion and is the ideal personal recycling container for tenants under MFD recycling programs.

#### E. Handles

Handles should always be a feature of personal recycling containers. Handles simply make transportation easier. As well, it is ideal to add bottom handles to tote bags; however, if adding the bottom handle is cost-prohibitive, this feature is not a requirement.

### 2.1 Distribution

#### A. Distributor

In the most ideal distribution situation, all originally identified stakeholders - property management, tenant volunteers, and recycling program administrators - would work together to distribute personal recycling containers. However, if this is not possible, it is important to consider other stakeholders who could help, including the contracted recycling haulers and volunteers external to the property (non-tenants). While the literature originally suggested a triad of stakeholders, the results of this research suggest that recycling haulers should be included and that non-tenant volunteers should be

considered. Thus, the following should be considered stakeholders in MFD recycling programs: property management, tenants, recycling program administrators (representative of local government), and contracted recycling haulers. Finally, non-tenant volunteers, such as a non-profit, could be considered stakeholders.

When considering influence, property management has the greatest ability to alter tenants' recycling behavior, fellow tenants have the second most, and recycling program administrators the third most. If a choice has to be made, stakeholders should participate to distribute recycling containers in the same order. This order is consistent with the provisional model. Property management is first because, theoretically, tenants interpret property managements' use of legitimate and coercive interpersonal power as "ownership" of the recycling program. Subsequently, tenants are more likely to participate in the 'property management's program.' As well, property management can use injunctive norms to coerce recycling behavior. However, coercion depends on the magnitude of punishment and likelihood that it will be administered. If property management is known for being lax, legitimate and coercive powers will not be effective. Tenants are second because they have referent interpersonal power with other tenants and can exude descriptive as well as injunctive norms.

### B. Method of Obtainment

While the provisional model suggested one method of obtainment should be offered, the availability of multiple methods for tenants to obtain recycling containers was found to be ideal. Providing only a single method appears to be harmful. First, all MFD tenants should obtain a personal recycling container when implementing a provision program. Second, and from that point forward, tenants should obtain containers if they are have the status 'new tenant.' Third, containers should be available for purchase in the leasing office if tenants' previous recycling container is lost, stolen, or missing.

Similarly, the ideal point in time at which tenants should obtain containers is when moving into the MFD. In an ideal world, property managers would introduce the program to tenants when they arrive

on move-in day. This presentation would effectively 'set the norm[2]' for what practices are common at that particular MFD. Finally, a personal format of recycling container distribution will always be better than an impersonal one. Personal interactions allow for communication in which tenants and authorities can make certain each understands the other.

### *C. Pricing Scheme*

MFD tenants should not have to pay for their personal recycling containers. This rationale is in line with the idea that MFD tenants are not likely to willingly purchase a container (in light of the perceived non-benefit from the purchase). As well, furnishing a free recycling container may 'nudge' into recycling those tenants who often intend to recycle but fail to do so.[3] Furthermore, providing free containers would bolster the injunctive norm that tenants should recycle.

While pricing is a sensitive subject and every program will have its own set of variances with which to contend, it is suggested that local governments and recycling haulers split the initial cost of a bulk purchase of personal recycling containers. Then, following initial distribution, tenants must pay for lost, stolen, or missing containers. This pricing scheme ultimately amounts to a one-time, split-cost buy for the city and hauler.

Determining how tenants will pay for lost, stolen, or missing containers is referred to as 'retention and replacement.' While this study is not modeling retention and replacement, pricing schemes are found to affect these two items; without a proper retention and replacement plan, financial loss is inevitable. As can be seen in Table 6.1, 'Retention and Replacement' is a variable of Pricing Scheme under Distribution.

Per respondents' comments, several methods for retention and replacement of lost, stolen, or missing containers follow. Fee clauses/deposits could be built into apartment lease agreements; or, fee clauses/deposits could be built into garbage and recycling service contracts. In the first option, one respondent made comments about how difficult it was to entice property managers to add recycling

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[2] Injunctive norm specifically; injunctive norms provide information on the behaviors one is expected to enact and those to avoid (Thomas & Sharp 2013).

[3] A nudge is any presentation of choice options in such a way that a person's decisions can be pre-programmed, but does not inhibit the user's ability to choose any option (Thaler & Sunstein 2009).

containers to lease agreements. Furthermore, this argument is bolstered by the fact that many respondents suggested property managers can be difficult in many different aspects of city compliance.

Concerning the second argument, it is not uncommon for MFDs to provide tenants with trash and recycling services, meaning haulers have contracts with the MFD property itself and not the MFD's tenants. If this is the case, the fee/deposit would have to be built into the tenant's lease agreement with the MFD. Otherwise, the hauler would have no authority to recover the cost of lost, stolen, or missing containers. Consequently, a quandary exists. Although property management is a mediator between tenants and the recycling hauler in this relationship, most sources point to the fact that they are not likely to insert recycling container fees or deposits into lease agreements. One thing is certain, if the contracted recycling hauler has agreed to pay half of the cost of the recycling containers, it is likely that the company will also want some way to ensure that the containers are maintained or that cost can be recovered.

### 3.1 Program Information

Respondents indicated that the main purpose of personal recycling containers is to make transportation and storage more convenient. Similarly, transportation and storage were two of the three barriers to MFD recycling identified in Chapter 2. In fact, this research suggested the use of personal recycling containers in response to the transportation and storage barriers. Similarly, most of the respondent-suggested 'purposes' for personal recycling containers were also suggested by the literature review (Chapter 3): Education and outreach, Encouraging recycling behavior, Increase diversion rate, Reminder to recycle, Relate an expectation, and most importantly, SFD Residents have personal containers, so tenants should too.

The most common issue that one should be aware of if implementing a personal recycling container provision program at MFDs is ensuring property management's commitment to help. Survey respondents emphasized it over and over – without property managements' help or buy-in, MFD recycling programs are bound to run into trouble. Property managers are an essential component to a

properly functioning MFD recycling program and ensuing tote bag distribution program; however, they are often the most reluctant to participate. Ironically, including traditionally unhelpful property managers in all decisions is ideal. The second most common issue concerned incremental program expansion. This suggestion is worthy of further investigation. Thus far, it has been suggested that an initial rollout of a recycling container distribution program should be citywide. Here, the suggestion is that specific MFD locations should be groomed to become properly functioning recycling program-sites before expanding to other properties. The value of this option is apparent – the ability to show an uncooperative property manager that other MFDs participate in recycling programs and are successful is extremely helpful.

Last, problems often arise if recycling containers are left with property managers for distribution. Many property managers do not perform the distribution as they said they would. If this problem is encountered, a suggested solution is to solicit volunteers; however, one respondent stated that unresponsive or uncooperative property managers were simply left out of their recycling container provision program. Leaving certain properties out of the program may be a wise choice in light of the expense related to personal recycling container purchases. A similar issue is the inability to gain access to MFD properties or property managers. Here, persistence is key. A final issue arises when containers are used for other activities besides recycling. The only viable solution to this problem is to consider distributing personal recycling containers only to tenants who want them.

# CHAPTER 7 - CONCLUSION

This study began with the observation that multifamily dwellings (MFDs) are often ignored when local governments administer recycling programs. It was known that the goal of this study was to encourage more MFD tenants to recycle; however, it was not known how this could be accomplished. Using these two observations as context, the community-based social marketing approach to problem solving was used to further dissect the typical MFD recycling program (Chapter 2). That analysis led to the identification of a structural characteristic that is universal to all MFD recycling programs – the presence of communal recycling areas.

Consequently, communal recycling areas were found to present several universal barriers to tenants' ability to recycle. These barriers were identified as transportation, storage, and space. Next, a universal strategy was identified to overcome these barriers. This strategy is the provision of personal recycling containers to MFD tenants. It was thought that personal recycling containers could provide a tenant the means to overcome transportation, storage, and space issues in all situations.

The literature was then reviewed in order to form a more holistic understanding of the situation (Chapter 3). As was expected, the literature review provided few clues about MFD recycling structures or personal recycling containers for MFD recycling programs but produced a decent amount of information on multifamily (MFD) recycling, comparative single-family dwelling SFD recycling, and recycling behavior. First, it was determined that there are two components to the provision of personal recycling containers to MFD tenants. Those components are design and distribution. These components were structured within an outline of a provisional model for the ideal method to design and distribute personal recycling containers – the conceptual framework. Second, the criteria that define each component were identified. The criteria defining design are capacity, message, color, form, and handles. The criteria defining distribution are distributor, method of container obtainment, and pricing scheme. Third, the criteria that were used to create the conceptual framework (Table 3.7) were then operationalized into

formats that could be quantified – the operationalization table (Table 4.1). A quantifiable format afforded the ability to measure concepts.

Experts who had previously participated in the design and distribution of personal recycling containers were then invited to share their opinions on ideal methods of provision. With a response rate of 71%, the results of this survey were found to be externally valid. The provisional model was supported for the most part; however several criteria were not. A discussion of the results and accompanying practical ideal model summary table are provided in Chapter 6 and Table 6.1.

Three issues reoccur in this study and are worthy of further exploration. These issues are property management relations, payment for personal recycling containers, and the retention/replacement of containers. First, participants in this survey indicated that property managements' participation is necessary to an MFD recycling program's success. If property management participates, the program will appear to have ownership, and theoretically, tenants will be more likely to respect a program that is 'owned.' As well, it was found that property managers have the most influence on tenants' behavior. As an example of how this ownership can be expressed, property managers could distribute recycling containers to new tenants upon arrival in order to express an expectation to recycle. However, just because property managers have the power to help does not mean they will willingly use their ability to assist. Thus, it can be said that it is of the utmost importance to attempt to gain the trust and help of property managers before implementing a personal recycling container provision program.

Second, payment for personal recycling containers is a reoccurring issue. Payment corresponds with the third issue of retention and replacement; these two issues will be discussed together. Undoubtedly, the pricing scheme that localities use to pay for personal recycling containers will vary considerably. However, it appears as if it is normal for tenants to not pay for their personal recycling containers. Thus, if tenants did not initially pay for their personal recycling container, retention and replacement must be a concern, especially for those who made the initial investment. Lost, stolen, or missing containers are an unsustainable financial drain to any program. This study is concerned with who will pay for the containers, a decision that will determine A) if containers are retained or released to the

tenant upon move out and B) how to replace containers. Consequently, when determining a pricing scheme, retention and replacement should be considered. While retention and replacement have been speculated upon in this study, definitive prescriptions have not been given.

*Future Research*

Several issues are worthy of further research. The first issue is the retention and replacement as discussed in the previous paragraph. The survey respondents' comments seemed to suggest that this issue is still unrefined – tenants should not pay for their personal recycling container, but the local government and the contracted hauler should split the cost. However, haulers often hold a single contract with property management, meaning haulers have no authority over tenants to apply fees or capture deposits for lost, stolen, or missing containers. As well, it appears as if property management, as the mediator in this relationship, is unwilling to attach fees or deposits to the rental agreement. Who will hold tenants accountable when containers are lost, stolen, or missing? This issue deserves more attention.

Second is identifying who should receive personal recycling containers. The survey results reveal that personal recycling containers are often lost, stolen, missing, used for other means, or never used at all. While it was originally thought that providing all tenants with containers is best (another nudge into recycling behavior) it appears as if the financial drain from lost, stolen, missing, or misused containers may be unsustainable. Respondents' commentary about incremental program expansion also supports further investigation into this issue.

Third, and most importantly, it should be asked whether the provision of personal recycling containers to MFD tenants does in fact increase recycling rates and decrease the presence of non-recyclable items in the recycling stream. While non-academic pieces of literature and several local governments' empirical reports support the assertion that tenants' use of personal recycling containers increases recycling rates, scholarly studies do not exist to validate this assertion.

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## Appendix

| 2 | If you wish, please record your comments on the issue of 'Capacity.' |
|---|---|

**Gallons**

| | |
|---|---|
| 1 | Our bag is 8.64 gallons. A survey completed in 2012 showed that 79% of the bag recipients felt the size was just right, 3% felt it too large and 18% too small. |

**Transport/Limited Spaces**

| | |
|---|---|
| 1 | smaller fit nicely under the kitchen sink or in a closet but need to be emptied more often to larger exterior container; larger bins hold more and could be picked up weekly |
| 2 | some will find this too small; however, one has to keep in mind that it has to be easy for the resident to carry the container to the central recycling area |
| 3 | spatial dimensions are more significant- flexibility to fit in small spaces, around pipes (ie; under sinks), capacity to stand on its own (ie; bag with darts) |
| 4 | Needs to be able to hold quite a bit, but still be manageable for a 10-yr old |
| 5 | needs to have small foot print easy to hang or set on floor |
| 6 | I'm guessing at what size our bags are in gallons.  It is small enough to fit under the sink, but wide and deep enough to accommodate several days worth of material. |
| 7 | The size needs to be convenient for kids, since often kids are the ones taking out the garbage and recycling. |
| 8 | MFD's need something small like a tote that can be stored away when not in use. |
| 9 | I am assuming you mean the size of a personal tote rather than the amount of collection service per household needed at an apartment community.  I've heard the following as needs for a personal tote: big enough to put milk jugs and newspapers, space efficient, something I can fold away when not in use, able to clean. handles. |
| 10 | It has to be small enough for residents to be able to carry up and down stairs in apartments, yet big enough to hold materials.  A 6 gallon container with a handle seemed to work best for us. |
| 11 | A family of 4 could use a larger container (from personal experience) but multifamily housing usually has limited storage space. |
| 12 | Our MFD program uses a reusable plastic shopping bag with printed instructions and educational info printed on front, and side panels. They have a handle on the bottom for easy emptying and are very popular.  At home our household of 4 uses a 10 gallon rubbermaid deskside container that we empty 2-3x/wk. Containers need to fit in limited spaces in apartments. |
| 13 | Since they cannot be wheeled containers or stored outside, the recycling container should be small and emptied frequently |

**Depends**

| | |
|---|---|
| 1 | Depends a lot on which items are accepted for recycling and the consumer habit of the individuals. e.g. if they get a daily newspaper. |
| 2 | Really depends on frequency of service; City of Portland does not consider 1-4 units to be multifamily |
| 3 | Some residents wanted two b/c we have a two stream system. But the idea was to collect and sort at the recycling station into the specific carts. Also it is something that they can buy at a $1 store in the future or if they wanted more. Other reason was to no tgive them too much capacity we wanted them taking it out on a regular basis and not sitting in the apartment as an eyesore or smelly. |
| 4 | we give 2 bags to each apartment unit |
| 5 | Capacity needs differ greatly by number of tenants per unit, types of products purchased, and recycling practices. |

| 5 & 6 | Please record your comments on Q#5 and Q#6 below. |
|-------|---------------------------------------------------|

| | Agree with Prior Answers |
|---|---|
| 1 | Language barriers are a huge obstacle to overcome because in MFDs there are a lot of different languages spoken. Pictures help, but it's also important to support them with text, otherwise the tenants may think it's supposed to be used as a reusable shopping bag. |
| 2 | Translation is good but images are best. |
| 3 | Images are often easier to understand and more universal, not only due to various languages, but also age. |
| 4 | Graphics are easily understood in all languages. If a dwelling is predominately Hispanic, we normally add Spanish subtitles or offer Spanish versions of the materials. |
| 5 | Pictures would eliminate need for various languages. |
| 6 | Photos help with language barriers as well. |
| 7 | We live in a mobile society and communities are inhabited by populations from all over. Providing messages in residents' first language helps. |
| 8 | Photos better than any language. It is best is the photos and messages on the in-home containers match the photos and messages on the large, shared, centralized containers (dumpsters, bins, carts.) Color coding is also helpful. Different colored dumpsters for garbage and recycling. "No garbage" and "No Recyclables" signs on the appropriate dumpsters. |
| 9 | YES pictures, very little text and use real pictures of materials in the grocery stores not cartoon like graphics. Yes local language. If you use pictures then everyone should be able to understand immigrants, kids etc. |
| 10 | Graphics are ideal in cases where residents don't read the language and if done correctly graphics get the message across better then words. |
| 11 | I think a mix of text and graphics is helpful. |
| 12 | A combination of images and text is good. Not all graphics are as intuitive as the creator of the graphic may think so text can clarify/reinforce the message. Use color wisely. We use color to denote specific streams. Blue means mixed recycling (paper metal, plastic bottle/tubs). So any sign, poster, bag, brochure, sticker that is specific to mixed recycling uses the same blue. Glass is orange and so on.....That way a resident sees their blue bag and goes to the enclosure with the blue sign and dumps the bag's contents in the dumpster with the blue stickers. |
| 13 | A combination of Pictures and simple text work best. Key words like metal, plastic, or glass. A bilingual approach should be considered based on the target audience, however if the messaging is simple enough then it may not be necessary. The readability of your messaging by speakers of any language may be a good test of its simplicity and clarity. |
| 14 | Most applicable to areas of diverse populations. |

| 15 | I prefer image heavy messaging on bags/containers, decals and posters, but also like to use wording to support and briefly explain program rules, especially in terms of what is and is not accepted. Example: Accepted: All clean dry paper + corresponding message in Keep These Items Out section: No wet or food soiled paper cups, paper plates, napkins and tissues. We supplement the info on our bags/posters/decals with a more detailed MFD Recycling How To Guide.   It is very helpful to have messages in the local languages. The challenge is how to put multiple languages on a singe piece without making it too cluttered. |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16 | Pictures work best.  Pictures in the laundry rooms, offices and other common areas of the complex work best.  Pictures supported by simple text in the major language of the complex.  In most cases here in the San Joaquin Valley, we use English and Spanish.  Text needs to be minimal.  Very few words. |
| 17 | Photographic images are ideal as they cannot be misinterpreted.  Often if the photographic images used are good, most residents will understand what to recycle without requiring translated information materials - however, having the messages translated and available works great as a back up. |
| 18 | A combination of text and pictures is best. Translating material into different languages can be costly, so pictorals of actual recyclables (not just cartoon-like drawings) is vital. |
| 19 | We have targeted specific issues and sent out communication notices to buildings with pictures highlighting these specific issues.  For example seeing a large number of black garbage bags in the "MFD" waste stream so we sent a flyer to buildings illustrating the proper use of a reusable multi-residential recycling bag and the improper use of a black garage bag.   Communication in multiple languages is important in diverse communities.  Having this information on-line or in waste guides hard copies is beneficial. |
| 20 | #5: Simple is better.  More pictures than text - no one takes time to read. #6: We provide recycle guidelines in 7 languages.  They are well received by ESL residents who pick the guidelines up at City-sponsored events.  However, we find that property managers will mainly ask for the English guidelines. |
| 21 | For #6, I would actually change my answer to "it depends" on the community. In-language materials can be useful, but images can supplement.  Some communities have multiple languages and imagery can help "translate" when it is not practical due to cost or space (graphic space). |
| 22 | transcreation is the term we use for translated materials which are enhanced with a knowledge about culturally relevant messaging and imagery. We transcreate, we do not translate. |

### Over-emphasis on Signage

| 1 | Graphics and text contribute minimally to the success of a program. The key to success is face to face interaction - you have to have to go door-to-door to help residents understand the program. I've tried both ways at dozens of properties - door-to-door interaction is key. |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | I do think though, that no matter how awesome the signage is, people often don't take the time to do it right. I've seen it happen more than once. We can have the most amazing signage in the world, but if people don't understand why recycling is important, how they make a difference, etc., then they won't take the time to do it right. |

| 7 | If you selected Disagree [in Q#7], please explain Why. |
|---|---|

**Concerns of Message Continuity**

| 1 | as long as messages, systems & branding don't change regularly. |
|---|---|
| 2 | One difficulty is that programs are constantly changing- putting information on the side of a container is permanent and can make the container out-of-date much more quickly than leaving generic messaging on the container. |
| 3 | Agree and Disagree - this works until your program acceptable material changes. |

**People Won't Read It**

| 1 | I have had experience with that and they do not read what is on the container! Additionally, what about when the commodities collected change? very costly to replace each container. |
|---|---|
| 2 | Observation tells me people don't look at the side of containers, but see the lid before they open it.  If there is no lid, or if the lid remains open, signage at eye level is preferred to side of container. |
| 3 | This is too passive - residents are busy, they will not take the time to read and understand the containers. Someone have to explain it to them - the graphics are better as a reference or a visual aid while explaining the program. |

**Other Methods of Info Delivery Should be Considered/are better**

| 1 | Give out detailed flyers to all residents in move in paperwork with their signatures on them. |
|---|---|
| 2 | However, this should still be supported by optional print material with photographic images. |
| 3 | messaging should be presented as a brochure or postable guide, at the site of garbage and recycling and in any other communication applications available (tenant newsletter, door to door education, tenant info meetings, posters in common areas, brochures and recycling basics included in tenant rental agreement) |
| 4 | It is important to print on the personal recycling containers but at the point of disposal has longer longevity and captures people who choose not to use container (ie. have other methods of collecting and carrying recycling). |
| 5 | Can be costly and not really necessary.  They will get the message is it's conveyed on the recycling containers throughout the complex and on posters in the common areas.   If there is a message on the container is should be WHAT to recycle not HOW to recycle |
| 6 | You are describing ONE ideal method; different circumstances require flexible responses, so I think a menu of responses would be great. |
| 7 | Again, the info on the containers needs to be supported by other pieces, including posters, decals on the outside containers, and Recycling How To Guides. We also have Recycling Reminder door hangers to remind residents of key program rules (e.g. loose items only, not in plastic bags). |

| 12 | If you wish, please record your comments on the following aspects of 'Message' on the recycling container. 1. identical messages 2. clear messages 3. use of pictures and graphics primarily 4. text in local languages 5. messages printed on containers 6. how to recycle 7. what can and cannot be recycled 8. where to recycling unaccepted items 9. contact information |
|----|---|

**7**

| 1 | Simply What Can and Cannot be Recycled |
|---|---|
| 2 | Messages on bags should show what to recycle and |
| 3 | We only include what can be recycled. |
| 4 | Most important to have simple language and...  Color coordination is ideal if possible (ie. blue container goes to blue bin). |
| 5 | Showing what not to recycle is confusing to many. |
| 6 | A NO list is not as important as people ignore a yes/no list. |
| 7 | Sometimes when both what "to" and "not to" recycle is presented, ESL persons get confused. A message to check Earth9-1-1 for other recycling options would be appropriate rather than lots of words for other unacceptable materials. |
| 8 | keep focus on what goes into that container only, |
| 9 | Keep it simple stupid! Only place what you want on the container that can be recycled.  Use other forms of P&E to explain how and what can't be recycled and special items where to bring them.. |
| 10 | We recently simplified our bag to focus on how to recycle properly (and less on where to take other materials that aren't accepted in the onsite containers.) We found that people still struggle with what can go in the bin so we decided to focus more on that message. |
| 11 | Information on what is and is not accepted in the program should be in the most visible part of the container/bag, wherever that may be. We put that info on the front of the bag. It's the largest surface and the most visible. Putting it on the sides would be too hidden for our purposes and the images would have to be shrunk to fit limited space, diminishing the effectiveness. |

**8**

| 1 | If this is too cumbersome, I would omit it. Although this is relevant information, if it muddles the simplicity of the message (of what is and isn't recyclable in your local recycle bin), then it defeats the purpose of the message on the container. |
|---|---|
| 2 | all except 8, |
| 3 | Where to recycle unaccepted items - too much info for the side of a container. |
| 4 | Providing the information on where to recycle unacceptable items on the recycling containers can be confusing to renters. |
| 5 | Keep it simple.  Just tell them what is acceptable in their complex. |
| 6 | I don't think it is necessary to specifically tell folks where to take "other recyclables" (although if locations are limited than that is helpful) |
| 7 | Where to recycle unacceptable items. If a simple link is available this is best as the list can be astronomically long. For example we use www.rcbc.ca/recyclepedia or www.tol.ca/wwg where people can find all the information they need on this topic. |
| 8 | It is important not to put too much messaging on containers as it may cause confusion or look crowded. Only the necessary information to |

| | |
|---|---|
| | participate should be on the container. |
| 9 | We recently simplified our bag to focus on how to recycle properly (and less on where to take other materials that aren't accepted in the onsite containers.) |
| 10 | These messages really depend where the bags are being distributed. In the San Francisco Bay Area there is a high focus on recycling and tenants are more likely to be willing to recycle because they've been doing it for so long. In places where recycling is just being introduced, it's important to show what is and isn't recyclable, but you don't want to give them information overload where they get discouraged and end up throwing everything in the trash, or recycling bin because they don't know what belongs in what. |
| 11 | Hazardous waste disposal info is good to have available as well. |

**9**

| | |
|---|---|
| 1 | contact information. |
| 2 | Provide City contact number for additional info. |
| 3 | Providing a contact phone number gives the resident a place to call if they have questions. |
| 4 | Drive tenants to website |
| 5 | I'm not sure contact information is needed but there should at least be a website with more information that includes contact information. |
| 6 | but at the least a phone number/website where they can find out where to take items is a must. |
| 7 | The contact information (phone and/or website) should be printed on the container so residents may know where they can find more detailed information. |
| 8 | What goes in the container, on the top and front of the container. Hauler (we have 18) contact and City contact on container as well |
| 9 | contact info for that container only |
| 10 | Keep it simple stupid! an e-mail and phone number of who to call for questions. |
| 11 | where to get more information. |

**Less Is More**

| | |
|---|---|
| 1 | less is always more |
| 2 | Space is limited.  Choose your messages wisely for the most impact. |
| 3 | Having to many message will confuse |
| 4 | All of this information would be helpful to the customer but that may be a lot of information on each container.  If it would fit, I agree.  If not, perhaps a website where the customer can get the information. |
| 5 | - however, some vehicles will require shorter, more to the point - i.e., not too much room on the bins.  Thus, info cards, posters, stickers can supplement this information while keeping the same messaging (just more detailed). |
| 6 | Space is limited on recycling containers. |

| 7 | might make it too busy and prevent people from reading the information in the first place. |
|---|---|

**2**

| 1 | Branding, using the same clear message, is essential. |
|---|---|
| 2 | Message should be concise to reduce contamination issues. |
| 3 | It should be simple and straight to the point, not an encyclopedia. |
| 4 | Messaging needs to be simple. |
| 5 | Try to keep messaging simply |
| 6 | Message should be simple; our city has multiple haulers so that information is not useful. |

**1**

| 1 | While messaging should be uniform and consistent, it may not be identical in some cases. |
|---|---|
| 2 | Consistent messaging is very important. |
| 3 | Branding, using the same message, is essential. |
| 4 | Consistency of messaging is important |
| 5 | Be consistent; balance simplicity with information. |

**6**

| 1 | keep 6 simple. |
|---|---|
| 2 | I think it is important to include information explaining how to recycle to residents, but I do not think it is necessary to include this information on the side of the bin - |
| 3 | Showing how is moot if they are doing it.  Too much info on the container (and the how could change). |

**3**

| 1 | Less words, more photos, |
|---|---|
| 2 | Most important to have simple language and images (of what CAN be recycled and where to get more information.)  Color coordination is ideal if possible (ie. blue container goes to blue bin). |
| 3 | images of what CAN be recycled |

**Comments on Overall 1-9**

| 1 | Messages on the container must be that which will not change; pretty limited |
|---|---|
| 2 | All important, but even if done perfectly, I fear people will still not comply. Perhaps it will catch on as this becomes more universal. |

**4**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | In Metropolitan urban areas it can be difficult to encompass all languages spoken in the community, but the top three are good to have some information available in. | | | | | | |

| 14 | Why did you choose the color you provided in Question 13? |
|---|---|

**Default/Standard/Common/Typical/Universal/Generally Associated/Recognized**

| | |
|---|---|
| 1 | default recycling container color in our area |
| 2 | Typical color used in MN |
| 3 | Standard |
| 4 | It's a very commonly used color for recycling collection on the west coast. |
| 5 | recycling containers at work are often blue |
| 6 | It's considered "universal" |
| 7 | Universal color utilized for public recycling containers. |
| 8 | it is the most common  (universal) recycling color |
| 9 | Commonly known for recycling and well recognizable. |
| 10 | this colour has always been associated with recycling. |
| 11 | In Northern California colors are starting to standardize:  blue = recycle, green = compost, black/grey = garbage. |
| 12 | Blue has become the universal color for recycling; however, because the word green is used to describe environmentally responsible people it's a good option too. |
| 13 | Blue is universally recognized as the color of recycling in California. |
| 14 | Blue is generally associated with recycling. |
| 15 | Blue is "universal" for recycling |
| 16 | It's the common standard practice to associate the blue bin or a blue chasing arrow symbol to recycling. |
| 17 | Blue is the standard colour recognized as recycling in Ontario since the inception of our Blue Box Recycling Programs. |
| 18 | Blue has become a recognized colour - associated with "Blue box", "Blue cart". |
| 19 | Blue boxes are often blue which helps with the link in the brain. [the respondent implies in his/her answer that blue is a "universally" recognized recycling color |

**Matches/Coincide/Depends on the Pre-existing Color Scheme**

| | |
|---|---|
| 1 | it is important to select a colour that is consistent with other recycling programs in the Municipality |
| 2 | Because residents identify it with other recycling carts, bins and containers. |

| 3 | Every area associates different colors with recycling.  Choose the color that is best known in your area.  Many areas use Blue for recycling. |
|---|---|
| 4 | Blue is already associated with recycling in many locations for some reason.  But folks should use whichever color is associated with that stream in their area..... |
| 5 | because it's the same color as household recycling bins |
| 6 | it is important to select a colour that is consistent with other recycling programs in the Municipality |
| 7 | match single family system |
| 8 | it really depends on what the local cart/bin colors are.  Indoor bin should ideally be same color as disposal container. |
| 9 | Dark Blue is the color of our recycle carts and dumpsters, so if the multi-family tote bags are blue hopefully the items will end up in the correct container. |
| 10 | The color of the container depends on the color of the recycling bin. If there are competing companies that use different colors, I would choose blue because in the Bay Area, blue represents the recycling bin color and most people associate blue with recycling. |
| 11 | These are specifically the colour of Kingston's curbside recycling boxes for our single-family homes. Colours of the containers should be consistent with what colour scheme each particular City or collection area uses, especially matching the colour on personal containers with the larger collection containers they will be emptying their personal containers into. |
| 12 | We chose red with our original recycling bag, since single family residents had red tote containers for recycling at the time we initialized our bag program.  Since that time, we started using roll-carts for single family recycling instead of red totes, so the color connection is less significant, though we have maintained that same color thru several reprinted versions. |
| 13 | It is our curbside program colours and the provincial blue box program |
| 14 | Consist messages of what & where to recycle are conveyed when using the same colors. |
| 15 | whatever color is chosen should be tied to all of the marketing materials, website messages, etc. |

**Colors are Symbolic of Concepts**

| 1 | Green represents [the environment] and white represents cleanliness |
|---|---|
| 2 | Green is for yard debris and food scrap collection. Brown / black  for garbage: see SF |
| 3 | green for the environment, blue because it is bright and attention getting. |
| 4 | Green represents one being "green" or being in touch with environmental issues. |

| 15 | If you wish, please record your comments on the issue of recycling container 'Color.' |
|---|---|

**Consistent/Matches**

| 1 | Recycling color should be consistent throughout the City or County |
|---|---|
| 2 | As long as the color is consistent within apartments/complexes, I don't think it matters. |
| 3 | Also good if the color of the in-home recycling containers matches the color of the large shared recycling containers/dumpsters that the in-home containers get emptied into. |
| 4 | It is important to be consistent throughout your program, i.e, single family, multi-family, commercial, etc. |
| 5 | We are trying to keep colours more consistent across our region and to streamline. We believe color can create a more immediate response in the brain (vs. text, photos). We stick with blue for recycling, black for garbage, and green for organic waste. |
| 6 | whatever color is being used for that town, use the same color |
| 7 | We selected red for our bag, but we still use blue to indicate that the item is accepted in the mixed recycling containers. Blue is often associated with recyclable in our region.    Whatever color is selected it should be consistent with your area's messaging. Color association can be a valuable education tool. |
| 8 | Ontario uses "blue" b/c we have the blue box program.  Use what color corresponds with your residential program.  I tell the community what you recycle at home, is the same as MR, schools, business, special events and in parks.  We use the same containers for all. |
| 9 | Different colors in different jurisdictions confuse residents and workers, especially when/since labels weather/wear off. |

**Bridging inability to match pre-existing colors by using Blue**

| 1 | If the hauler has a specific color for recycling containers, then use that...even better.  In our area all our haulers have different style and colors for their containers so we just picked blue for all the recycling bags, signs, stickers. |
|---|---|
| 2 | Because haulers have different branding for their bins, it is hard to match up the bag color with the receptacle color. For example, Waste Management uses green trash bins and white recycling bins. However, we provide blue recycling bags. This causes some confusion among residents. |

**Coloring**

| 1 | Color can be a simple form of messaging but it should not be the only one. |
|---|---|
| 2 | Some jurisdictions use Green and some use Blue. To some, Green can represent "green waste", so blue is often the alternate color used to avoid confusion. |

| | |
|---|---|
| 3 | Some use green but in Fort Worth - green color is for yard trimmings |
| 4 | we have 6 sorts and they are colour coded at the drop-off totes. |
| 5 | primary colors look sharp |
| 6 | We use grey background with a big gold arrow with a blue header. The gold arrow is highly visible and matches what's on our posters and decals. Whatever color you use, make sure your images and wording stand out against the background so that they're easy to read. |
| 7 | We used blue to identify recycling containers since the inception of curbside recycling in 1992. |

| 19 | If you wish, please record your comments on the issue of 'Form' of recycling containers. |
|---|---|

**Pro-tote/Anti-bin**

| | |
|---|---|
| 1 | bins are more expensive and more likely to be stolen by residents when they move out. |
| 2 | Apartment dwellers don't always have the space to put a bin in their home. |
| 3 | but [bins] are also more expensive. The soft bags are versatile, have good holding capacity and can be folded and tucked away. It's probably a lot cheaper to print detailed images and instructions on the plastic bags we use. |
| 4 | soft easier to fold and put in car or other place if dropping off recyclables en route to car etc.  Also soft is almost always less expensive. |
| 5 | tote bag is the most cost and space efficient solution |
| 6 | Some prefer the ease of taking a soft container down to the recycling area, folding the bag and then carrying on to their work/school without going back up to their apartment. |
| 7 | A hard bin may be cost prohibitive. |
| 8 | I'd be interested to see if there had been a survey of residents on that topic.....We picked bags because of cost, space efficiency, printability and ease of distribution.  Its also easier to sling over an arm then carrying a heavier tote. |
| 9 | hard material is O.K but hard to store for property managers |
| 10 | The tote bag reduces waste because the tenants don't have to use bags and they're easy to carry. |
| 11 | Tote bags can be easily stored when not in use this frees up space in a small MFD. |
| 12 | Container should be easy to store, easy to clean and easy to sling in the car after emptying on the way to work. |
| 13 | During our Multi-Family recycling review in 2011, residents indicated that they had trouble transporting recycling to the common totes so we created and distributed MF totes bags for each MF unit. They work well because people tend to recycle on their way to the car, and the bag can be tossed in the back seat until they return (a container is more difficult). On a personal note, I also use a basket in my unit, and then transfer to carry bags to take my recycling down.   We had an overwhelmingly positive response to the bags we distributed, and anecdotal evidence from our MF volunteer program says that people are using them.   We used the PP Woven bag from this company: http://www.oasisbags.com/materials/ |
| 14 | A plastic container made from recycled plastic...with a handle is ideal |
| 15 | we handed out 25, 000 bags everyone loved them.  Can be washed and hung on a door knob.  Doesn't require much space. |
| 16 | tote is more flexible & adaptable to space. also can be carried, then stored in vehicles; |
| 17 | We have used both - tote bags seem to be the most effective because they are portable and have a small footprint. We often see them at local super markets being used as reusable shopping bags! |
| 18 | Either form of container would work well but the tote bag is ideal when there are space constraints. |

| 19 | I selected rigid plastic for question #17, because recycled content should be a driving factor and a PP rigid plastic container is accepted at our local recycling depots.    A soft tote bag is easier for tenants to store when it's not in use. |

**I don't know/Personal preference**

| 1 | I'm not sure whether a soft or hard bin is preferable. |
| 2 | n Toronto, Ontario, we provide the option of a hard material or soft material container. |
| 3 | I'm not sure one is ideal over the other.  We have used both in our pilot and tenants didn't seem to have a preference. |
| 4 | Tote vs. bin is a matter of personal preference. |
| 5 | Whether it's a hard material or a soft material, is really preference, but as a municipal program we like to offer containers made from recycled-content plastic. |
| 6 | It is difficult to choose a preference for the form of container. Each resident has their own preferences and each container has its pros and cons. Cost, or local preference, is usually the main decision-making point. |
| 7 | Don't know if one answer fits all.  Hard vs. soft personal recycling container preference will vary. |
| 8 | Either form of container would work well but the tote bag is ideal when there are space constraints. |
| 9 | However it seems some residents may prefer a hard material container.  We have not performed any studies to show that a hard container would generate more participation than a soft bag. |

**Anti-tote/Pro-bin**

| 1 | Think soft containers will get soiled and tossed out. |
| 2 | Bins are more liked and more used by residents, |
| 3 | a plastic bin will hold more material then a bag |
| 4 | Rigid plastic is more durable and can be washed out in the sink if there are leaks from recyclables. |
| 5 | Rigid containers can be good if residents have the space (e.g. underneath their sinks) |
| 6 | Hard greater longevity in unit, |
| 7 | I  Some residents prefer the ease of keeping a hard container clean. |
| 8 | hard material is O.K but hard to store for property managers |

| 22 | If you wish, please record your comments on the issue of recycling container 'Handles.' |
|---|---|

**Handles make Transportation Easier**

| 1 | Handles make it easier to carry |
|---|---|
| 2 | Much easier to hold something with handles. |
| 3 | handles make it easier for residents to transport their recyclables and to empty their containers. |
| 4 | Handles definitely makes carrying recyclables easier |

**Bottom Handles Work**

| 1 | We have used 3 versions of the bags - the one with the handle on the bottom seems to get the best results. |
|---|---|
| 2 | We included the handle at the bottom and it was appreciated by residents |
| 3 | Those bottom handles are important. |
| 4 | They're a nominal cost and make it easier for the users. Anything that can help break down barriers to use is a positive. |
| 5 | Handles on totes are a must,  The larger the bin the more likely you will need some sort of handles to help carrying and emptying. |

**Questions of Necessity when Using Handles on a Hard Container**

| 1 | but not sure it's a must have in hard containers. |
|---|---|
| 2 | but on rigid bins it depends on the size. |

| 23 | If you feel that another stakeholder should be involved OR if one of the stakeholders listed above should be removed, please explain |
|---|---|

| | **Hauler** |
|---|---|
| 1 | Haulers should be involved as well. |
| 2 | It is often helpful to have a representative from the refuse hauler, since they are picking up the recyclables. They often discuss issues such as contamination and trash rate reduction as a result of increased recycling. |
| 3 | The local waste hauler should also be involved.  In many cases the hauler providing the actual recycling services is different from the program administrators. |
| 4 | Hauling company. |

| | **Property Management** |
|---|---|
| 1 | Ideally, the property management will take responsibility to get the containers to their tenants.  That would be the most reliable way.  Not all buildings have tenant volunteers or recycling committees.  Often City staff (recycling program administrators) are not allowed access to buildings for door to door distribution.   The property management must take ownership for the program to be successful. |
| 2 | The recycling program admin should deliver the bags to the property management who should then get tenant volunteers or staff to deliver the tote bags to the tenants. |
| 3 | Ideally, the property management will take responsibility to get the containers to their tenants.  That would be the most reliable way.  Not all buildings have tenant volunteers or recycling committees.  Often City staff (recycling program administrators) are not allowed access to buildings for door to door distribution.   The property management must take ownership for the program to be successful. |
| 4 | In a perfect world, the mix identified above would be great; otherwise, recycling program staff hand off to PM who hand off to residents |

| | **Volunteers** |
|---|---|
| 1 | As a municipal employee (could be perceived as recycling program admin) we don't have staff to pass out bins to all 500 complex residents in Fort Worth, so feel on a practical level bins should be passed out by managers and perhaps tenants on Care Teams etc. |
| 2 | We also use a team of Master Recycler volunteers to distribute via Knock N Talks.  The Master Recyclers are volunteers that have taken an 8-week course in the recycling system and they can then answer any questions during the Knock N Talk (door to door outreach and bag distribution) |

| | |
|---|---|
| 3 | It's great if you get tenant volunteers involved in distributing the containers/bags but I don't think it's necessary. Whatever it takes to get them out to people. We hired a high school community action club to do it for us and they did a great job. The less work for the maintenance staff, the better if they're already overworked. |
| 4 | Again this really varies by complex.  Some property managers want to handle the distribution themselves.  For those, we just dropped off all the tote bags with the manager and the apartment staff took care of it.   For others we hired the Boy Scouts to do initial mass delivery of tote bags to each doorstep.  At one complex we had a pizza party by the pool and tenants picked up their bags at the party. We have also distributed bags at HOA meetings.  Work with each complex to figure out the distribution method that works best for them. A lot of it will depend upon level of security/ease of access.  In all cases leave a supply of containers with the manager for new tenants who move in after the initial distribution. |

**Misc.**

| | |
|---|---|
| 1 | Only one organization the EWSWA handed them out.  We used only our staff to ensure the bags actual made it to the residents and kept records on distribution.  Also made for good relationships with residents as they could ask us questions and also was very valuable for my self to see all the different issues at the MR buildings.  Can't always rely on PM and volunteers and might be more work in the end. |
| 2 | I don't think all stakeholders have to be on site to distribute the recycling containers necessarily, but I think it is important to have regular check-ins with all three groups to ensure communication is the same throughout. Additionally, an educational component of providing bins to the tenants should include contact information for all stakeholders involved. |
| 3 | as long as there's buy-in which there often isn't.  in that case whoever is motivated should take the lead & make it as convenient as possible for the others. |
| 4 | The recycling program administrators will need the bags to be consistent with the local program, the property managers don't decide this. |
| 5 | as long as there's buy-in which there often isn't.  in that case whoever is motivated should take the lead & make it as convenient as possible for the others. |

| 26 | If you wish, please specify who the 'other' distributor you selected in Q#25 should be. |
|-----|---------------------------------------------------------------------------------------|

**Volunteer/Non-Profit**

| 1 | Non profit |
|-----|-----------------------------------------------------------------------------------------|
| 2 | Local non-profit.  Scouts,, conservation corps, etc. |
| 3 | Volunteers |
| 4 | Volunteers |
| 5 | Volunteer organization, if possible. |
| 6 | and Master Recycler volunteer |
| 7 | community volunteers; respected community leaders; |
| 8 | Volunteers that have been specifically training in answering all kinds of recycling system questions.  However, fellow tenant, and property managers are great to have on an outreach team... |
| 9 | environment groups, or community groups, perhaps students who need to undertake community volunteer hours |
| 10 | Master Recyclers. In our region we have a Master Recycler volunteer program. These volunteers can be useful tools for education and outreach purposes. |
| 11 | Master Recycler or program field staff conducting knock and talks |
| 12 | Local community or school clubs can be helpful, either paid or volunteer. |

**Maintenance Staff**

| 1 | janitorial/maintenance staff |
|-----|-----------------------------------------------------------------------------------------|
| 2 | Maintenance staff |

**Hauler**

| 1 | Garbage hauler |
|-----|-----------------------------------------------------------------------------------------|
| 2 | Waste hauler staff |
| 3 | Hauling company |
| 4 | Hauler reps |
| 5 | waste hauler |

| 6 | Hauler |
|----|--------|
| 7 | Contracted or Municipal Garbage Company |
| 8 | Distribution company |
| 9 | And/or the local recyclables collector / garbage hauler. |
| 10 | I'd put haulers ~~recycling program administrators.~~ |
| 11 | Hauler |

| Q27 | If you wish, please record your comments on the issue of recycling container 'Distributor.' |
|------|------|

**PM Buy-in/Participation**

| | |
|---|---|
| 1 | Ensuring buy-in on the program from property managers is crucial as they are on-site staff that have the most control over the success of the program. If they demonstrate that they care about the program, I think there is a greater likelihood their residents will care and participate properly. |
| 2 | Property Manager distribution would engender more "ownership" of waste reduction programs, and could be designed to meet their needs. |
| 3 | The success of recycling at any MFD will depend on the property manager.  Their involvement is key. |
| 4 | It is ideal to have the pm help with the distribution, but they are often too busy to do so |
| 5 | By "act together" you mean coordinate?   In our experience the Recycling Program Administrators provide the materials to the property managers who have been primarily responsibly for distribution. We have not worked with tenant volunteers |
| 6 | All property managers are different. I try to respect the way they want to do things. If they wish to have their staff distribute materials, it frees me up to visit other businesses, complexes, etc. |

**Misc.**

| | |
|---|---|
| 1 | Property managers may be better suited if they live on site and can remind tenants to recycle |
| 2 | Haulers need to work together with the managers to ensure material in the recycling containers are low residual. |
| 3 | While I think fellow tenants is a novel and trial worthy endeavor I haven't yet hear of this being done to much extent. |
| 4 | If we had resident volunteers (www.tol.ca/ambassador) we had them distribute. Residents knocked on doors and engaged residents in a conversation about recycling. It went very well.  When volunteers were not available, Township staff distributed the bags via door handles.   Property managers delivered them on select occasions but we preferred to have ourselves or volunteers do it to ensure it was done.  Each bag contained a letter explaining the bag and how to use it. |
| 5 | the property manager should ensure they have enough bags to distribute to existing tenants and new tenants |
| 6 | Manager should have stock on hand |

| 28 | Other formats that should be used to distribute containers |
|---|---|

**Mass Distribution and New Tenants**

| 1 | Flawed question. Need to be able to choose multiple items in this one. Containers/bags absolutely need to be mass distributed to EVERY unit. Then property managers need to have a supply to give to ALL new move ins, preferably along with their welcome packet. We have average annual turnovers in Dublin of 30-60%. If ALL new tenants don't get instructions and resources from the get go, the program in their complex will fall apart over time. We give each complex a 1yr supply for new move ins, based on 40-50% annual turnover. Containers/bags should be available by request as well if they lose or damage their bags. |
|---|---|
| 2 | To start a program, a mass distribution during an education event should kick it off. Once that is done, tentants should receive a container when they move in. Distribution on move-in should be from a tenant recycling advocate. Since MF dwellers are usually mobile, an annual education and distribution event should be scheduled. |
| 3 | initial mass distribution and then for new tenants. Should be done as a part of a "campaign" |

**Mass Distribution with Supplemental Distribution and New Tenants**

| 1 | Mass (1+) and New Tenants |
|---|---|
| 2 | So I would have selected the 2nd and 4th option if I could have selected two. |
| 3 | Both mass distribution with supplemental distribution and when new tenants arrive. |
| 4 | Mass distribution with supplemental for stolen and new move-ins |
| 5 | Mass distribution initially, then when new tenants arrive and as containers are lost, stolen, broken. |
| 6 | Mass distribution with supplemental distribution for missing or stolen containers (1+ times) AND when new tenants arrive. |

**Misc.**

| 1 | #1,2,3,4 |
|---|---|
| 2 | I think a multi prong approach not just one choice .should be made available .upon move in , available at an meet and greet event, or upon request |

| 31 | If you wish, please record your comments on the issue of the 'Format of Obtaining' recycling containers. |
|---|---|

**Property Managers/Setting the Norms/Personal**

| 1 | I like it when property managers include the recycling area (use of the container, what is accepted, etc.) as part of the move in tour. |
|---|---|
| 2 | Would be great for the property manager to set the stage for the importance of recycling. |
| 3 | Mass distribution is the easiest way for someone trying to deliver the containers, but a personal delivery each time a tenant moves in would do more to improve recycling rates.  This approach would have to involve the property manager in order to work. |
| 4 | During a major life change (like a move) folks tend to be more open to creating new habits - this is a great time for a property manager to give a recycling container and walk the new resident out to the recycling area - set the norm and let the new residents know that "this is what we do here - we recycle" |
| 5 | The easier and more personal it is; the more likely they are to ask for one and use one. |
| 6 | don't think it matters, but personal is better, just not necessarily affordable. however, any recycling education with outreach- 30 second 'hello, intro, got questions?' helps if folks are home. common area presentations are great & less resource intensive. |

**Misc.**

| 7 | It never hurts to have a personal introduction but I don't think it's absolutely necessary if you provide an effective alternative means of introducing the program and resources that are clear to understand and easy to use. Our outreach letter approach seems to do the job. |
|---|---|
| 8 | We did a mass blanket of the Township with these bags. We left a few extra bags with property managers (when applicable) for future move-ins.   We have never been contacted by property managers to replenish stocks. I suspect it is not a high priority for them which is why we wanted either volunteers or ourselves to do the original distribution. |
| 9 | Delivering door-to-door or even asking them to pick them up in the manager's office. |
| 10 | Giving a person a bin is not going to make them start recycling. If they have the desire to ask for a bin in the office then they will recycle. The tenant must put some "skin in the game" so to speak. |

| 33 | Who is the 'Other' that should pay for tenants personal recycling containers? |
|---|---|

**Local Gov't + Haulers**

| | |
|---|---|
| 1 | Local government together with haulers |
| 2 | We (the hauler) split the cost with the cities we work with |
| 3 | It depends on how the city's recycling program is set up. If there is a franchised hauler partnered with the city, either the city or the hauler should pay or split the bill. If the MFD is in a free market and the property management is the one interested in the recycling containers, they should pay. If the city wants to improve their recycling program, they should pay. |
| 4 | If government or hauler can buy that is best but if not build it into rental agreements |

**First Containers should be free**

| | |
|---|---|
| 1 | I think this should depend on the local rate structure and programs. I believe that in most situations, the tenant should get the first container for free but be charged for replacements. |
| 2 | Depends on local situation. We have had local gov't pay for them and then have the containers included as part of MFD deposits. |

**Misc.**

| | |
|---|---|
| 1 | The cost of these resources need a reliable and adequate source of funding, regardless of where it comes from. If local government can provide that, great. If it needs to be built into the hauler collection fees, fine. Recycling haulers should not have to pay for these resources, it should not be left to the discretion of individual property managers, and tenants should not have to pay out of pocket (they won't do it). Systematic pass through costs might work, not sure. Someone needs to purchase containers/bags in large quantities and make sure every property has an adequate supply. Piecemeal won't work and the cost of purchasing small quantities will be prohibitive. |
| 2 | It depends on the goals and the policies in place. If the local government provides recycling containers to their single family householders, in fairness similar tools should be provided to multi-family householders. |
| 3 | In our city, MFDs must pay a mandatory recycling fee based on the number of units on property. A small amount of this should be used to purchase containers. |
| 4 | depends on the hauler and the City sometimes it's both sharing the cost of the containers usually they're bought with grant money()city) or franchise fee funds |

| 34 | If you wish, please record your comments on the issue of recycling container 'Pricing Scheme.' |
|---|---|

**Grant-funded**

| 1 | We have used grant funds to provide these containers in nearly every case. As mentioned earlier, the bags can be used to convert properties over to recycling programs, |
|---|---|
| 2 | Our City purchases tote bags with grant funds. If we didn't have this option we would include the requirement in our hauler contract. |
| 3 | Grant money may also be available. |

**In Favor of Free**

| 4 | It was important to us (as local gov't) to increase low recycling rates in MFDs so we wanted to pay for the cost. We distribute blue boxes for free to single-family dwellings so felt it was appropriate to offer something to MF units as well. |
|---|---|
| 5 | Tenants should be able to obtain containers for free up to a certain point. Abuse of the system is possible, but can be controlled through recording addresses where containers are being distributed. |
| 6 | If a program is just getting started, the city/county, property management or hauler should pay the initial costs of the bags. Subsequent bags should be built into rental agreements so that the program is sustainable for future tenants. |
| 7 | Make it easy, make it free and residents/property managers will participate. Make it inconvenient and charge them, they won't. |

**Tenants Eventually Pay**

| 8 | Ultimately if a PM pays, the tenants will eventually pay somehow from rents. I think it is in the PMs best interest to have residents managing their materials as best they can - PMs should provide the tools and knowledge for residents to do that |
|---|---|
| 9 | No direct charge to tenants for containers. Make them "free." However, no matter which of the other options you select, the tenant will be paying for the containers indirectly in garbage and recycling bills, taxes, rent, etc. |

| | |
|---|---|
| 10 | In essence the "customers" really always pay in one way or another. I prefer for the program administer to make the purchase, but the program funds ultimately come from the customer's monthly garbage service payments (in most cases). |

**Misc.**

| | |
|---|---|
| 11 | Again feel tenants should put some skin in the game. |
| 12 | Haulers should provide them |
| 13 | If the municipal waste services are built in to residents property tax then they should not have to pay. |

| 35 | In your opinion, what is the purpose of distributing personal recycling containers? |
|----|----|

**Comparing SFDs to MFDs**

| 1 | all homes have them so apt tenants should too |
|---|---|

**To Encourage**

| 1 | encourages recycling |
|----|----|
| 2 | Encourage recycling at each unit. |
| 3 | To encourage recycling |
| 4 | Encourage tenants to recycle. |
| 5 | To encourage diversion and |
| 6 | Encourage activity; |
| 7 | To encourage and |
| 8 | To encourage and |
| 9 | to encourage tenants to recycle |
| 10 | and encourage to recycle. |
| 11 | to encourage residents to recycle and recycle properly, |

**Transportation/Convenience/Storage**

| 1 | help the public recycle |
|----|----|
| 2 | convenience |
| 3 | Facilitate |
| 4 | Convenience factor. |
| 5 | Convenience for tenants and |
| 6 | To get the recyclables from the unit to the recycling room. |
| 7 | help tenants move recycling material from their residence to the main containers.  Make it fun and interesting. |

| 8 | and make it easy |
|---|---|
| 9 | make recycling easy for the tenant. |
| 10 | make it easier |
| 11 | making it as easy as possible to recycle. |
| 12 | Provide convenient attractive and |
| 13 | carry recycling out to collection |
| 14 | making it easier for residents to store and transport their recyclables to common building recycling containers. |
| 15 | Giving residents the tools they need to participate in a recycling program. |
| 16 | Makes it easier for tenants to get the materials from their kitchen down to the trash/recycling enclosures in the parking lots. |
| 17 | by making it easier |
| 18 | and tool |
| 19 | that they have their own, personal instrument to help them to recycle. |
| 20 | To lower barriers to recycling in MF buildings. |
| 21 | Providing a tool to help resident recycle right and keep plastic grocery bags out of the recycling stream (often used as default recycling bags) |
| 22 | by providing convenient methods of disposal to residents. |
| 23 | Recycling should be made as easy and convenient as possible. |
| 24 | a) To provide a convenient way for tenants to store and transport their recyclables.. |
| 25 | To make it convenient, to make sure that they put all items loose (in plastic bags not allowed in our program), |
| 26 | The purpose of tote bags is to make recycling more convenient for residents.  MF residents don't pay directly for garbage service so they don't see the direct benefit of saving money on garbage service by recycling. |

**Increase Diversion Rate**

| 1 | Increase diversion |
|---|---|
| 2 | increasing recycling |
| 3 | To increase recycling rates |
| 4 | increase recycling rates in MFD where recycling options are not traditionally offered. |
| 5 | To improve waste diversion by |
| 6 | Increase recycling |
| 7 | to increase recycling. |
| 8 | to increase recycling diversion |

| 9 | To increase recycling participation and e |
|---|---|

**Education/Outreach**

| 1 | education tenants about the importance of recycling |
|---|---|
| 2 | Educate |
| 3 | to inform |
| 4 | education outreach |
| 5 | Education. |
| 6 | information always at fingertips. It will help tenant do a better job. |
| 7 | Educating building residents about their responsibility to recycle in their community and take personal responsibility for their actions. |
| 8 | informative method to |
| 9 | to assure they have the recycling information |
| 10 | Providing information, |
| 11 | Outreach opportunity when introducing a new program. |
| 12 | Making the MFD resident realize that recycling is available at their property and |
| 13 | you are killing many birds with one stone.  Tlking to people residents, PM ETC.  Becoming more informed regarding issues at MR. Public outreach. |
| 14 | b) As public education about the program.  Increase awareness |
| 15 | educate about what is accepted in the recycling collection. |
| 16 | and to have instructions printed right on the container in case they lose their Guide. |

**Reminder to Recycle**

| 1 | Reminder - |
|---|---|
| 2 | Reminder |
| 3 | Behavior change - |
| 4 | and more obvious |
| 5 | reminder |

**Relate Expectation**

| | |
|---|---|
| 1 | and way to educate an expectation |
| 2 | to let them know property managers are invested in recycling |
| 3 | To indiacte to the tenant that recycling is expected. |
| 4 | Emphasize importance of recycling and property's commitment to the cause |

**Decrease Contamination**

| | |
|---|---|
| 1 | decrease contamination |
| 2 | to reduce contamination |

| 36 | **Please provide any information you wish you would have known when just starting your MFD recycling program - information that you think an entity embarking on a MFD recycling program would want to know.** |
|---|---|

**Do it Right From the Beginning**

| 1 | Do it right from the start. Set up the recycling infrastructure correctly and completely BEFORE rolling out the program. Have all signage up, make sure all residents have instructions and containers, announce the program before rolling it out or granting resident access to the outdoor recycling containers/chutes. |
|---|---|

**Communicate**

| 1 | Proper communication should be sent out to buildings targeted to both property managers and to residents. |
|---|---|
| 2 | Educate your residents, keep lines of communication open and remind them. |

**Empiricism**

| 1 | Better empirical database / numbers on MF units in city |
|---|---|
| 2 | Waste audits waste time and resources.  Check once in awhile, but generally, the recycling is clean if the garbage is signed and emptied frequently. |

**Every Tenant does Not Want to Recycle**

| 1 | MFDs are one of the hardest programs to implement because there are so many different types of people. Since most bins are shared by the entire complex, people start to care less about what goes in which bin. It's a tragedy of the commons. If tenants are paying the bill, they care even less about what goes in which bin. |
|---|---|
| 2 | Let those that want to recycle, recycle. Can't force people but might be able to provide financial incentives to encourage tenants to recycle. |

**Volunteers**

| 1 | It is helpful to have Recycling Ambassador volunteers for buildings. |
|---|---|
| 2 | Also, if you can get resident volunteers, it helps. They can be a site contact for recycling information. |

**Annual Visits**

| | |
|---|---|
| 1 | Annual visits - important. |
| 2 | MF Recycling Programs are an on-going effort.  There is a lot of property manager and tenant turn-over so you need to make contact with properties on an annual basis. |
| 3 | Contamination of recycling is high in MFD facilities that have constant turnover |

**Start Small**

| | |
|---|---|
| 1 | Start small and work up incrementally to include all MFD units (it can be cost prohibitive to do all at once). |
| 2 | Phase it in one area of the city at a time to maximize communication and operation resources. |
| 3 | Make sure the property has enough recycling service before encouraging more recycling.  If the property's recycling bins are already overflowing, newly inspired residents will just be discouraged and the bins/bags will have gone to waste. |

**Consistency**

| | |
|---|---|
| 1 | consistency of images and language used to describe is of major importance |
| 2 | The more intensive and consistent the outreach, the more effective the practice; plan on constant reinforcement and limit your expectations |
| 3 | Use stickers and posters with same graphics as totes. |
| 4 | The program (materials accepted, messages, graphics, branding, color scheme) should be standard throughout the city.  The implementation (type of in-home container, method of distribution) should be customized by complex or even by unit. |

**PM are Reluctant to Help - But We Need their Help**

| | |
|---|---|
| 1 | Property managers are very difficult to get a hold of. Our summer students, in some cases, had to call random residents via the intercom system to see if a tenant had a call number. |
| 2 | Property managers do not want to be bothered with recycling or the education. They are often reluctant to hand out personal containers or education materials. |
| 3 | Building owners won't cover a lost, missing container in a *security deposit* |
| 4 | It is important to have the buy-in of property owners/managers and to provide them with education tools and training on how to set up good programs in their buildings. |

**Containers**

| | |
|---|---|
| 1 | What, if any, preference there is for in-unit container style? |
| 2 | containers can be easily misused or thrown away if not wanted by the property manager or tenants. |

| 3 | Require property managers to add the recycling bins to the check-out list or find some other way to hold residents responsible for their return when they move out. |
|---|---|
| 4 | Containers are expensive. |
| 5 | Distribution of the tote bags.  I suggest delivery directly to the property manager of a board member.  If not available, make an appoint or have them pick them up from you. |

**Interesting Ideas**

| 1 | See if reverse vending machines for low-income properties can be utilized.  Get a base for what recycling is colleced before education begins so you can brag to tenant/managers about improvements made. |
|---|---|
| 2 | Where I work, the recycling is at a reduced rate so the more you recycle the more you save, but if the tenants aren't paying they really don't care. When the burden is on them, it encourages them to recycle more. |
| 3 | works best for some types of complexes- when convenient to transport back & forth. |

**Outreach & Education**

| 1 | Education |
|---|---|
| 2 | Educate |
| 3 | to inform |
| 4 | education outreach |
| 5 | Education. |
| 6 | information always at fingertips. It will help tenant do a better job. |
| 7 | Educating building residents about their responsibility to recycle in their community and take personal responsibility for their actions. |
| 8 |  informative method to |
| 9 | to assure they have the recycling information |
| 10 | Providing information, |
| 11 | Outreach opportunity when introducing a new program. |
| 12 | Making the MFD resident realize that recycling is available at their property and |
| 13 | you are killing many birds with one stone.  Talking to people residents, PM ETC.  Becoming more informed regarding issues at MR. Public outreach. |
| 14 |  b) As public education about the program.  Increase awareness |
| 15 | educate about what is accepted in the recycling collection. |
| 16 |  and to have instructions printed right on the container in case they lose their Guide. |

**Reminder to Recycle**

| | |
|---|---|
| 1 | Reminder - |
| 2 | Reminder |
| 3 | Behavior change - |
| 4 | and more obvious |
| 5 | reminder |

**Relate Expectation**

| | |
|---|---|
| 1 | and way to educate an expectation |
| 2 | to let them know property managers are invested in recycling |
| 3 | To indicate to the tenant that recycling is expected. |
| 4 | Emphasize importance of recycling and property's commitment to the cause |

**Decrease Contamination**

| | |
|---|---|
| 1 | decrease contamination |
| 2 | to reduce contamination |

| 37 | If you experienced issues or problems in the provision of personal recycling containers to MFD tenants, please explain in detail 1) what the issue was and 2) how it was solved. |
|---|---|

| | Issue/Problem | Solution |
|---|---|---|
| | **Need a Way to Ensure Proper Distribution** | |
| 1 | Not sure they get distributed consistently; ~~program concern about their effectiveness as educational resources (as opposed to attractive schwag)~~ | N/A |
| 2 | Property manager forgets to give them out so we end up going to the person and giving them one | N/A |
| 3 | Making sure they get to each tenant, especially if the building does not have a on-site building manager. | N/A |
| 4 | Our biggest issue is ongoing maintenance distribution of bags.  When we initialized the program it was easy to give bags to EVERY resident in an MFD community.  After that point, however, it is more difficult to maintain a distribution pattern since some residents have bags from previous distributions. | N/A |
| 5 | Also, need a reliable and affordable way to distribute the containers/bags. | N/A |

Bags Used for Other Purposes

| | | |
|---|---|---|
| 1 | The bags sometimes are used for purposes other than recycling - I have seen the tote bags used to carry things, not just to recycle. | N/A |
| 2 | I have seen my containers used as buckets to wash cars, | N/A |
| 3 | Many tenants want the recycling bins because they are "cute" and who  knows what they eventually get used for. | so we get ones that have holes or are not rigid.  I have had entire deliveries for a complex end up in the dumpster so I don't just give them out without some sort of commitment from the property manager. |
| 4 | Some tenants thought the bags were single use, other used them as shopping bags. Some expected a third party to collect the bags and take them to the recycling bin for them. | Education is key to behavior change. |

**Program Implementation**

| | | |
|---|---|---|
| 1 | Low turn out for the kick off events limited the number of containers distributed. | N/A |
| 2 | Apartment Managers had limited on-site storage to conduct a mass distribution so the roll out was staged over a protracted 2 month period. | N/A |
| 3 | When first implemented, delivery to existing residents can be tricky. ideally should involve personal interaction to explain use & provide information / answer questions | N/A |

**Difficulty Gaining Access to Properties / Property Managers**

| | | |
|---|---|---|
| 1 | Difficulty gaining access to some properties, and contacting property managers or reaching tenants when they are home. | N/A |
| 2 | Same as above. We also had some PMs that didn't want to grant us access at all. A couple of our buildings never did get bags. | N/A |
| 3 | The most difficult/time consuming part was contacting all of the property managers to get permission and make arrangements. | N/A |

**Expensive**

| | | |
|---|---|---|
| 1 | The high expense was difficult for us, and we put it off for several years. We over came this by partnering with a neighboring county to reach higher economies of scale together with a larger bulk purchase. | N/A |
| 2 | Managing the cost of distributing and re-distributing in-unit containers | has not been solved as of yet. |

**What to do with uncooperative Properties/Property Managements?**

| | | |
|---|---|---|
| 1 | One MFD stored the tote bags in a closet for a period of time without distributing them to the tenants. | When revisited to gauge compliance, pm decided he did not want to participate. We removed the bags |
| 2 | The City of Fort Worth received a grant by which we purchased and issued some recycling containers to MF managers that turned in their recycling plan. Some managers DID NOT want the bins and said COME GET THEM. | N/A |

**Bags Will be Stolen/Taken**

| | | |
|---|---|---|
| 1 | Recycle bins being stolen by residents who move out of the MFD. | We replaced them for awhile, then reminded the managers regularly that they needed to make sure that residents left them behind when they moved out. |
| 2 | the tenants take the containers with them | N/A |

**Misc.**

| | | |
|---|---|---|
| 1 | Finding safe tote material made in USA or even in Canada. Every company used Chinese products. | N/A |
| 2 | It looks like the City will be funding initial and replacement recycling bags/kits for the next two years but that's not certain and who knows what will happen in the future. These resources should be viewed as a permanent operating cost and paid for through the hauling rate structure to guarantee available funds. | N/A |
| 3 | Tenants are influenced most financially. If there is a problem with too much garbage in the recycling, if possible, the best thing to do is pass it onto the tenants so they're held responsible and want to keep everything clean. | N/A |

| 38 | In your judgment, do you think any of the criteria of Design (Capacity, Message, Colors, Handles, and Form) need to be removed, or another criterion to be added for a suggestive model of personal recycling containers for MFD tenants? |
|---|---|

**Misc.**

| | |
|---|---|
| 1 | budget/cost |
| 2 | Water proof/resistant.  Easy to wash. |
| 3 | Durability |
| 4 | No - matching tenants needs to available containers is the best strategy. |
| 5 | No, unless adding picture instructions. |
| 6 | You need to allow for program changes - so maybe a sticker and not a hot stamp. |
| 7 | Make bag look colorful and fun. Hang a tag on as to what can be recycled and any other information such as a blank space that you can write where bins are or who to call for questions. |
| 8 | Add Rental agreement language/clause is helpful to provide to the property managers |

| 39 | In your judgment, do you think any of the criteria of Distribution (Distributor, Method of Obtainment, & Pricing Scheme) need to be removed, or another criterion to be added for a suggestive model of personal recycling containers for MFD tenants? |
|---|---|

**Misc.**

| | |
|---|---|
| 1 | Community support, do tenants and property managers want/support purchasing and using these? |
| 2 | Containers should be delivered with a message about the program (i.e. letter with graphics) |

**Retention/Replacement**

| | |
|---|---|
| 1 | I would suggest adding follow up to the model.  How do you ensure that people continue to recycle? |
| 2 | Yes.  Some method of retaining the recycle bins must be addressed or a method of replacement. |