



DESIGNING FOR OCCUPANT RECYCLING

Designing for occupant recycling presents architects and designers with an opportunity to create an easy, efficient, and even, fun system within a building to maximize the materials diverted from the waste stream. Traditionally, a building's waste management system focused solely on garbage collection. Today, office recycling is common and supporting occupant recycling is considered a key part of designing a "green" building. Therefore, it is increasingly important for recycling collection systems to be incorporated into building design.

This fact sheet was developed to help the building owner and their architect or designer understand how to design for occupant recycling. It includes key principles, design steps, and tips to do it effectively. It is written for an office building setting; however, many of the principles apply to other types of buildings. Additionally, while there is discussion of costs and operational issues, the sheet was written with the assumption that the primary goal is to allow for maximum recycling by the occupants of the building.

Key Principles

The following key principles apply to any project where you want to support occupant recycling through building design. Use them along with the design steps and tips on the following pages to create the best program for your project.

- **Design for flexibility.** The services offered by recycling companies and the markets for recycled materials change over time. In addition, changes in the use of a space may change the waste stream generated in that space. Therefore, highly specialized recycling systems are likely to become obsolete. Simple alcoves and cabinets with space for multiple, changing recycling containers may be the best approach. Corresponding to changes in the recycling program within the building will be changes to the outside collection containers at the loading dock. Therefore, this area, too, needs to have built-in flexibility. For example, provide enough space to be able to switch from three open-top containers to a large compactor, one open-top container, and a baler as the building's recycling needs change.
- **Make it easy and convenient.** The most successful recycling programs are easy to understand and convenient for the users. This means having containers for both recyclables and garbage within easy reach of every waste generation point. (See Determine Where Materials Will Be Generated for more information.) Additionally, each recycling and garbage center should look similar for easy identification. Space for signage by each recycling and garbage center is important too. Finally, the recycling system needs to be easy to service by both janitorial staff and the recycling companies.

- **Use the same system for recyclables and garbage.** This principle is related to ease and convenience, and to making sure the program is cost-effective. It means, for example, not putting in just a garbage chute and expecting recyclables to be taken down the elevator. This would require more time and work by janitorial staff for handling recyclables, which costs more and may discourage proper recycling. If the recycling system is the easier one of two systems, you will likely experience high contamination because it is easier to throw garbage into the recycling container or chute.
- **Consider the existing system.** Frequently, the tenants for a new building are moving from an existing building. If they are used to having their recyclables picked up at their desk and the new building requires them to take them to a central location, recycling rates will likely drop. Similarly, you can improve recycling rates by offering a better system.
- **Plan for the range of recyclables.** In addition to common recyclables like mixed paper and beverage containers, office buildings generate a range of less commonly recycled materials. You may not need to design a special system for each of these materials, but consider how each of them could get from generation point to a collection area for recycling. Some examples include pallets, packing peanuts, shrink wrap, ink/toner cartridges from copiers, fax machines, and printers, used electronics like computers, and grease and food scraps from food-preparation areas. One idea is to place an alcove by each freight elevator where less common recyclables can be collected for transportation down to the loading dock. This area could also be used for flattened cardboard boxes, which won't go down chutes.
- **Involve all players.** Include building owners, future occupants, and, if possible, maintenance and operations staff, janitorial staff, and the recycling company staff in planning for the system. These people will be the ones that really make the recycling program work, no matter how clever your design, and therefore need to influence the decisions made.
- **Remember promotion and education.** Although the building designer is not responsible for promotion and education of a recycling program, these elements are essential for an effective program. Make sure all the building owners and staff understand the system you design so they can in-turn operate the system well and educate the building occupants. The BIRV has excellent resources to help building owners promote their program.

Design Steps

Now that you understand the key principles, follow the steps below (keeping in mind the unique features of your project) to help maximize recycling.

□ DETERMINE WHERE MATERIALS WILL BE GENERATED

The first step in designing an effective recycling and garbage collection system for your building is to determine what kind of wastes will be created in the building and where they will be generated. **Each location where wastes are generated will need space for containers to collect both recyclables and garbage.** You may want to design and build special alcoves or cabinets to hold these containers, but allow for future changes in the program.

In a typical office building you will likely find these wastes:

- **Each workstation/office** – Mixed paper, small amounts of beverage containers, food waste and packaging, and garbage.
- **Copier, fax, and printer stations** – Mixed paper, ink and toner cartridges, and garbage.
- **Lunch/break room and cafeteria** – Beverage containers, newspaper and magazines, food waste and packaging, and garbage.
- **Meeting rooms** – Mixed paper, beverage containers, food waste and packaging, and garbage.
- **Loading dock and shipping/receiving area** – Cardboard, mixed paper, possibly pallets and shrink wrap, and garbage.
- **Information technology departments** – Cardboard, computer packaging, possibly pallets and shrink wrap, and garbage.
- **Retail and food services** – Cardboard, mixed paper, beverage containers, food waste and packaging, possibly pallets and shrink wrap, and garbage.

□ DECIDE HOW MATERIALS WILL BE COLLECTED

After identifying the locations of generation, you will need to determine how the materials will be collected from those locations. Then, you will need to decide what sort of “intermediate system” will be used to deliver those materials to the loading dock or outside area where the recycling and garbage companies’ containers are located. **It is essential to work closely with the building owner and future building occupants to determine the best system to include in the building.** If known at the design stage, the janitorial and recycling company staff can provide excellent input here as well.

- **From generation locations.** Either the building occupants or janitorial staff can be responsible for collecting and consolidating the recyclables and garbage on each floor. One of the key principles, however, for designing an effective system is making it easy and convenient for the users. Therefore, choosing to have the janitorial staff collect recycling and garbage from workstations is a better option. Note that in Seattle, the city where curbside recycling was pioneered, collection by janitorial staff is the norm for most office buildings. Thus, designing a system based on collection by the building occupants, at least for an office building, is not recommended. In this kind of system, garbage is more likely to pile up and recycling rates tend to be lower.
- **To the loading dock.** Once the materials are collected, there are two options for delivering them to the recycling or garbage companies’ containers. The first is to have the janitorial staff bring the materials down via the elevator and dump them into the containers. The second is to use garbage and recycling chutes. This option is similar to traditional garbage chutes, but adapted to also handle recyclables – either by the use of additional chutes or by using a rotating container (controlled electronically by the user on each floor) under a single chute. Both the chute systems and the transportation by janitorial staff approaches have benefits and associated costs.

■ **Chutes vs. janitorial staff.** The primary advantage of chute systems is in reduced labor costs for transporting recycling and garbage down to the loading dock containers. Depending on the height of the building, these labor savings may or may not offset the increased first cost of the chute system. Janitorial staff may also find a chute system more convenient and therefore be more likely to get the rerecyclables and garbage to the right place.

■ **Single vs. multi-chute systems.** More sophisticated single chute systems with electronic controls on each floor and rotating bins in the loading dock may cost more up front and require more maintenance than installing a multiple chute (one for garbage and one or more for recyclables) system. Also, the single-chute system uses multiple smaller bins, which may require more frequent pickup, thereby increasing costs. These systems, however, will take up less space per floor than multiple chutes and can be adapted more readily to changing recycling systems.

■ **At the loading dock.** The primary area where building design influences effective recycling programs is in the loading dock. To accommodate a comprehensive recycling program, the loading dock or other area for outside containers needs to have space for multiple containers and access for recycling and garbage trucks coming to pick up containers. The Director of Seattle's Department of Design, Construction, and Land Use has issued a rule requiring new commercial buildings to have adequate space and access for recycling. The rule includes specific requirements that should

be referenced during design. (See *Storage Space Requirements*) Keep the following concepts in mind when planning this space and the recycling system.

- At minimum, the loading-dock area will need space for two containers, one for garbage and one for recycling. Most buildings have multiple containers for recycling. For example: One for commingled paper and beverage containers, one for cardboard (or a cardboard baler), and possibly one for food-waste composting.
- Both recycling and garbage pick up are more cost-effective if collected less often in larger containers. For example, a once monthly collection of an 8-cubic-yard container for mixed paper is much cheaper than a weekly collection of 4 90-gallon Toters™ (similar to large trash cans).
- Compactors allow more garbage or more recyclables to be held in the same space and are more cost-effective. Balers, such as for cardboard, also compress recyclables in smaller spaces, but their cost-effectiveness varies.
- There needs to be an easy way to get materials into the containers (by janitorial staff or chutes) and an easy way to get the containers out of the loading dock.
- If there will be a recycling program in the building, the space traditionally needed for garbage may be smaller since materials will be diverted to the recycling program.

□ EVALUATE THE COSTS AND BENEFITS

In our area, separating recyclables from garbage generally saves money over having everything hauled away as garbage. (See the BIRV fact sheet *Are There Dollars in Your Dumpster?*) Depending on the markets for recycled materials and the volumes generated in a building, recycling companies may even pay for a material. When designing a collection system for recyclables within the building, the object is to keep it cost-effective and to maximize the recyclables collected through the system, thereby maximizing savings. The costs involved in such a system are spread across a variety of departments and budgets.

■ **First cost.** This is the capital cost of designing and building the infrastructure for the collection system. Recycling and garbage chutes have higher first costs.

■ **Space.** This is both a first cost and affects the long-term revenue from and use of a building. As discussed above, a good recycling infrastructure will

require space at generation locations for collection containers and at the loading dock for the recycling company's containers. It may require additional storage space on each floor or space for a chute system. The space requirements do not necessarily impact the net usable (rentable) area in a building, but need to be considered.

- **Facilities.** There is also a first cost involved in purchasing and installing containers, signage, container labels, janitorial carts, and other equipment for starting the recycling program. These are usually borne by facilities departments, but could be incorporated into construction costs.
- **Maintenance and operations.** These costs would include maintaining a chute system or possibly extra elevator maintenance and energy use; keeping bins clean and replacing lost, stolen, or broken bins; purchasing bags, if needed, for recycling containers; etc.

- **Labor.** Labor is one of the most significant costs of collecting recyclables and garbage. Collecting recyclables and garbage from the generation points on each floor is most efficient when the recyclables and garbage are collected at the same time. By equipping the janitorial staff with a two bin cart, they can quickly dump both recyclables and garbage from each location without having to take extra steps.

Labor is also involved in the second part of the collection system, delivering the collected materials from each floor to the recycling and garbage companies' containers. A chute system for both recyclables and garbage generally reduces these labor costs. Taller buildings will see the most labor-cost savings from a chute system.



Tips from the Field

The following tips are lessons learned by BIRV staff and others in the recycling field through years of work in setting up recycling programs.

- Future users of the recycling system can provide useful, specific suggestions. During design of King Street Center, King County asked a team of staff to provide recommendations to the architects. The resulting report helped guide the direction of the final program.
- Standardizing the look of the recycling centers (in color, shape, etc.) helps a building occupant identify them quickly and increases participation. This is a creative opportunity for designers to design an eye-catching look.
- Each recycling area needs a garbage container. If garbage and recycling are not located together in a convenient location, you get higher contamination of recyclables and/or many recyclables end up in the garbage containers.
- Alcoves are a flexible design approach to making space for recycling. Use them in hallways, kitchens, and even meeting rooms. Make sure they can accommodate multiple containers of varying size. Simple cabinets are another good idea.
- Recyclers may provide containers like cardboard desk-side boxes or containers for aluminum cans at no cost. Ask about these options so you can plan for them.
- Recycling program where the user has to do less sorting, as in a commingled program, have higher participation rates and divert more recyclables.
- Cardboard boxes do not go down recycling chutes very well. Consider designing a special cardboard collection spot on each floor, next to the freight elevator.
- Fire regulations might limit how much recyclables can be stored temporarily before being transported to the loading dock. Check with the fire marshal or the fire codes.
- In tall buildings, chutes can backdraft, blowing paper and other light recyclables back up the chute. If necessary, work with the manufacturer to design and construct the chute to avoid backdrafts.
- Pressure gauges for compactors help assure the compactor is completely full before calling for a pick-up.

Storage Space Requirements

The following chart shows the solid waste and recyclable storage space requirements for commercial projects constructed in the City of Seattle.

Building Size	Minimum Storage Space Required	Type of Container
0 - 5,000 sq. ft.	82 sq. ft.	Rear loading
5,001 - 15,000 sq. ft.	125 sq. ft.	Rear loading
15,001 - 50,000 sq. ft.	175 sq. ft.	Front loading
50,001 - 100,000 sq. ft.	225 sq. ft.	Front loading
100,001 - 200,000 sq. ft.	275 sq. ft.	Front loading
200,001 plus sq. ft.	500 sq. ft.	Front loading

The design of the storage space also has to meet the following requirements. These are good guidelines for all projects to use when designing this storage space. They assure that there is enough space for the required containers and that the recycling and garbage companies can access the space for collection.

- The space has no dimension (width and length) less than six (6) feet.
- The floor of the space is level and hard-surfaced (garbage or recycling compactors require a concrete surface).
- If located outdoors, the space is screened from public view and designed to minimize light and glare impacts.
- The space is located on private property.
- The space is not located in any required parking area.
- The space does not block or impede any fire exits, public rights-of-ways, or any pedestrian or vehicular access.
- The space shall be located to minimize noise and odor to building occupants and neighboring developments.
- Ramps to the storage space where **rear-loading containers** (usually two (2) cubic yards or smaller) will be used are of six percent (6%) slope or less and gates or access hallways are a minimum of (6) feet wide.
- Direct access is provided where **front-loading containers** (usually larger than two (2) cubic yards) will be used. All gates and openings and vehicle access routes should be a minimum of ten (10) feet wide; and, when accessed directly by a collection vehicle into a structure, a twenty-one (21) foot overhead clearance should be provided.

Where To Get More Information

- The **Business and Industry Resource Venture** can help developers, architects, and facility managers, set up a building-wide waste prevention and recycling program, and assist with many other topics related to occupant recycling. (See *At Your Service* section of this fact sheet.)
- For the full text of Seattle's requirements for solid waste and recyclable storage space see ordinance # 119836 on file at the City Clerk's Office and through their Web site (under *Legislative Codes*) at **clerk.ci.seattle.wa.us**
- For questions on Seattle's requirements for storage space contact Jim Lowenstien of Seattle Public Utilities. **(206) 233-3839**

At Your Service

The Business and Industry Resource Venture provides *free* information, assistance and referrals to help Seattle businesses improve their environmental performance. We are a partnership of the Greater Seattle Chamber of Commerce and Seattle Public Utilities.



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