

# SAN FRANCISCO'S INTEGRATED RECYCLING PROGRAMS

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## ABSTRACT

Since 1979 the tonnage recycled in San Francisco has increased by approximately 10% per year, reaching a recycling rate of approximately 24% of the commercial/residential waste stream in 1985. This recycling rate was achieved by the private and public sectors working together to implement a variety of integrated and innovative recycling programs.

Programs include: office paper recycling in all City buildings and in the private sector; newspaper recycling (available for all single-family homes; apartment complexes and office buildings); cardboard collection from commercial sector, curbside recycling; buy-back recycling centers; wood waste recycling; metal recycling at transfer station; collection of whole wine bottles and glass from bars and restaurants; composting programs; public education; and school education.

The Solid Waste Management Program of the City and County of San Francisco (referred to herein as "the City") has been in existence since 1979. It was set up to take a three pronged approach to solid waste management: (a) recycle as large a portion of the waste stream as possible; (b) secure long-term landfill; and (c) develop a Waste-to-Energy project if feasible. From the start, recycling has been a high priority for the

City as a method of reducing the amount of waste requiring disposal, thus reducing the cost of waste management.

The San Francisco Solid Waste Management Program's approach to increasing the rate of recycling has been to assist in the development of an integrated program involving community recyclers, private firms and garbage collection companies. The goal has been to diversify recycling programs to add stability, convenience, opportunity and choice.

Whenever possible, the City has built upon the recycling programs that were already in existence to prevent the duplication and/or displacement of existing businesses. It is hard to eliminate all duplication; however, through careful planning and research the integrity of recycling markets and business structure has been maintained.

The purpose of this paper is to document the diversity and comprehensiveness of San Francisco's recycling programs. Due to the length requirements on papers by this publication only a brief discussion of each program is possible. The paper starts with a discussion of the office paper recycling programs which contribute the most to the City's recycling rate. A discussion of cardboard collection from the commercial sectors follows, which is one of the oldest programs

and the second largest contributor to the recycling rate. Further, two other commercial sector programs unique to San Francisco are discussed: the whole wine bottle and mixed glass bottle collection programs which are directed toward bars and restaurants.

Programs directed at the residential sector are next. They include: newspaper recycling, curbside collection, drop-off and buy-back centers. Our two newest programs are highlighted next: waste wood recycling and composting. They are followed by a brief discussion of the metals recycling taking place at the City's transfer station.

The paper closes with discussions of the City's general public and local school system education programs. The summary/conclusion of this paper elaborates on the theme of integration, diversity, flexibility and long-term commitment of the program.

## **OFFICE PAPER RECYCLING PROGRAMS**

San Francisco has a highly concentrated and growing business sector which is primarily involved with financial and trade services. It is also the location of the corporate headquarters for many large businesses. These organizations produce a tremendous amount of high quality and high value paper that have strong domestic and foreign markets.

Recognizing that this sector of San Francisco's economy is both a problem area (a rapidly growing producer of high volume waste) and an opportunity (a producer of readily recyclable commodities) led to the establishment of the "Office Paper Recycling Program". This program is available to any and all businesses within the San Francisco city limits. The City provides all of the technical assistance and promotional material required to plan and implement such a program, including: employee training seminars; desk top containers for each employee; posters; brochures; and many other promotional and educational materials. All of the services and materials mentioned above are provided free of charge. The City maintains contact with the businesses after program implementation to ensure the program's continued success.

### **CITY'S OFFICE PAPER RECYCLING PROGRAM**

Before working with the private business sector, the City established its own program for all city offices. The city government has over 28,000 employees spread out over approximately 56 office buildings. The highly

integrated program targets the various types of waste generated, and offers a separate service for their collection and recycling. The following is a description of how the program works at City Hall.

#### **White Office Paper Collection**

To collect white paper separately from other paper, each employee is given a desk top container for his/her use. The employee is asked to put white paper into the desk top container instead of the waste basket. When the desk top container is full, the employee empties it into one of several large barrels located in various centralized locations for the employee's convenience. Once each week an employee of the City empties each centralized barrel into bins that are stored outside of the building in a locked alcove area. These bins are in turn picked up by a private waste paper dealer. The waste paper dealer is selected by a yearly competitive bid process.

#### **Newspaper Collection**

Newspaper recycling has recently been added to the office paper recycling program in City Hall. The pilot program was established in cooperation with the garbage collection contractor. Newspaper is collected separately in special containers placed by the building's cafeteria. The garbage collector has a separate route for newspaper collection, and empties the containers once per week.

To kick off this program, which asks each employee to voluntarily bring his/her newspaper to the bins by the cafeteria, a special promotion was run in which City officials including the Mayor, Chief Administrative Officer and members of the Board of Supervisors donated a set dollar amount for each full container collected during the first month. The money raised was donated to childcare programs in the City. The garbage collector continues to keep a count of the full containers collected each month and donates money to childcare on an ongoing basis. This program is currently being expanded to serve several other office buildings throughout the City.

#### **Mixed Waste Paper Collection**

The third and final recycling program is the process begins with the nightly collection of garbage by the janitorial staff. The garbage is collected and dumped into a compactor unit each night and pulled by the collection company when full. However, instead of

taking this compactor directly to the City's transfer station, it is taken to a processing plant and its contents are dumped onto a conveyor belt, sorted by a small crew (four people) who remove nonpaper waste (generally about 20% to 30% of the compactor's contents by volume) from the mixed waste paper. The paper fraction is then baled and sold to domestic and/or foreign paper mills for recycling.

This same process takes place for all "garbage" (recyclable paper) from the downtown financial business district of the City. The effect is to have a layered, diversified approach to waste collection from businesses in the City's financial district and the government sector.

### **CARDBOARD COLLECTION FROM COMMERCIAL SECTOR**

Old cardboard boxes have been collected from commercial establishments for many years by the City's garbage collection companies and independent scavengers. There is a large volume of cardboard available from small commercial businesses who break it down and set it out to be picked up by the garbage company with a compactor truck, or by an individual scavenger with a pick up truck. Cardboard is collected by individual scavengers because it is easy to collect, in abundant supply, and the market for the commodity is fairly strong. Many people derive a second income or their only income from the collection and sale of cardboard from the commercial sector.

Further, in recent years many large retail stores have installed cardboard balers. The baled cardboard is returned to the stores' main distribution center as a back haul, or sold on a contract basis to a paper broker who collects the bales on a scheduled route.

Even with all the attention given to recycling cardboard, there is still a large amount of it that is not baled and/or set out loose for separate collection. The unseparated cardboard becomes part of the waste stream and is hauled to the City's transfer station.

Whether mixed in with compacted garbage or in open roll-off boxes, commercial and industrial accounts supply a large volume of easily sorted cardboard. Roll-off boxes and/or compactor units with cardboard that is not heavily contaminated can be dumped onto a conveyor belt or on the ground. Cardboard can then be quickly sorted from the garbage destined for disposal. This type of garbage sorting is taking place in communities throughout the nation, and a test sorting program is currently taking place at San Francisco's transfer station.

### **NEWSPAPER RECYCLING PROGRAMS**

Recycling newspaper takes many forms in the City. As already mentioned, City offices and other business offices recycle newspaper as a separate part of the general recycling of office paper. Newspaper is also collected by community groups as fundraising drives, by community nonprofit recycling centers, for-profit buy-back recycling centers, and by the garbage collection companies on their routes from any resident of the City that bundles, ties and sets it aside from the garbage. The garbage collection companies in San Francisco have been recycling newspapers from the residential sector since the early 1900's.

Collecting newspaper from large apartment buildings, (eight units or more) is a relatively new program, starting in 1983. The quantity of newspaper that can be collected requires an additional separate container for effective and efficient service. It is similar to the office building program. Newspaper is placed in separate bins by the apartment tenants or manager, and these containers are emptied on a regularly scheduled route by a compactor truck.

The response to the apartment recycling program has been very positive. Over 1000 apartments are currently being served, and 4000 new accounts are in the planning stage.

Apartment owners and managers are especially interested in the program because the newspapers are collected free of charge. Newspapers are a high volume waste, thus significant savings can be realized over time by apartment owners that participate in the program.

### **CURBSIDE RECYCLING**

San Francisco's curbside recycling program began 3 years ago in one of the few single family home areas of the City. After starting out with great fanfare, it achieved limited success in its first year. Several methods were tried to increase participation rates. A rebate to participating customers on their garbage bills received the best response. However, the project has never come close to a break-even point.

The biggest blow to the program came in the second year when illegal scavenging began. The program's tonnage dropped by more than half in the second year. Newspaper and aluminum cans are the commodities targeted for theft. An anti-scavenging ordinance was discussed and drafted, but lack of commitment to enforcement has kept the ordinance from becoming a reality. The frank assessment from the parties involved is that the cost of catching, arresting, and prosecuting illegal scavengers would far outweigh the value of the program.

Furthermore, because of San Francisco's unique demographics and topography, curbside recycling could never service more than 30% of the population. Due to the high cost of the curbside program, even when it did not experience thefts, it is highly unlikely that it could become cost effective. Therefore, the majority of the San Francisco residents would be paying higher garbage collection rates to pay for a program in which they could never participate.

### **DROP-OFF RECYCLING CENTERS**

A large part of San Francisco's recycling population participate in the drop-off center programs because they feel that their donation of materials will not only help the environment, but keep the center open and economically viable. Drop-off centers in San Francisco are long-term institutions, and they have been doing well financially. Most have been in the same location for over 10 years, and they enjoy committed support from a loyal clientele.

### **NEIGHBORHOOD BUY-BACK RECYCLING CENTERS**

To attract citizens who are not currently recycling, two approaches are being taken. The first approach is to locate recycling centers in convenient locations, and the second is to pay customers for their materials. The most important is convenience; therefore, neighborhood buy-back recycling centers are being placed in shopping centers throughout the City to make for one stop recycling and shopping.

Neighborhood buy-back recycling centers utilize overseas shipping containers for on-site storage. The containers are refurbished, water sealed, and painted. Signs are painted onto the bins giving the hours the center is open, the materials taken, and the name and phone number of the organization managing the center in case of an emergency.

The equipment necessary for each center includes a small scale, wall-mounted fold-out desk for check writing, check protector machine, battery operated calculator, fire extinguisher, first aid kit, aluminum can bag holding hoop, and four small bins for color separated glass. Whenever possible, the centers add another large roll-off box to sit beside the overseas container for the storage of newspaper. A specially designed hand-operated magnetic separator is being tested at one of the sites, and if it proves successful that piece of equipment will be added to all of the centers.

Neighborhood buy-back recycling centers are a low cost alternative to curbside programs. The centers can be placed in almost any parking lot because they require no more than two parking spaces per center. The other positive aspect for San Francisco is they can serve all residential sectors of the City, thus not discriminating against those residents living in areas where curbside recycling would never be practical.

### **WHOLE WINE BOTTLE COLLECTION**

The collection of whole wine bottles from restaurants for rewashing and resale to local wineries for refilling has been a part of San Francisco's recycling program for over 3 years. Restaurants are either contacted directly, or by use of a direct mailer, and asked if they would like to participate in the program.

The method of preparation for participating restaurants is very simple, and compliments most restaurant inventory control procedures. The employees are asked to put empty wine bottles back into their original cardboard shipping cases. Many restaurants ask their employees to do this anyway to assist in counting empty wine bottles for inventory control. Putting the empty bottles back into their original shipping cartons ensures neat storage and easy handling on pick-up days.

On scheduled collection days empty cases are set outside by the participating restaurants. The collection process takes place early in the morning, between 5 and 10 a.m. A standard van or larger step van is used for pickups. The cases of empties are stacked inside the van and brought back to a central yard for processing.

Processing the wine bottles for shipment to the rewashing plant is the most costly and time consuming part of the process. The bottles must be removed from their cardboard boxes, lead or plastic neck rings must be removed, and the bottles sorted by size and shape into wooden shipping crates. The high value of the sorted bottles makes the project worthwhile when collection, processing, and shipping are handled efficiently.

### **COLLECTION OF GLASS FROM BARS AND RESTAURANTS**

The success of the whole wine bottle program led to the establishment of a separate collection program for all glass bottles from bars and restaurants. Because many of the establishments participating in the whole wine bottle program asked for a collection service for all of their glass bottles, a test program was planned



and implemented. Mixed glass bottles are collected either broken or whole and sold to a glass bottle-making plant for recycling.

A specially designed truck has been ordered for the glass collection program. It has a rear loading bucket to lift bins or barrels of glass and dump them into an open truck bed. The loading bucket runs on tracks and is hydraulically dumped anywhere along the track for even loading.

The program is being managed by both of the local garbage collection companies. They provide separate containers free to participating establishments, and a separate collection route services the glass accounts on a weekly or more frequent basis if needed.

### **WASTE WOOD RECYCLING**

In late 1984, two companies began waste wood recycling projects in San Francisco. One company is a private debris box hauling firm that services construction sites. The second company is the City's transfer station operator. Both firms found that by dumping out the contents of select debris boxes, and sorting wood, metals, cardboard, and other recyclable materials, they could recycle most of the volume in each box. Recycling construction debris has led to a significant reduction in waste volume requiring landfill, and sorting and processing construction debris is a lower cost alternative to landfill disposal.

After the wood is separated from the other debris box contents, it is processed by a hammer mill grinder and turned into wood chips. These wood chips are in turn sold to companies with wood fuel boilers, and the wood chips are converted into electricity. These waste wood programs also divert tree branches from City parks and tree pruning companies.

### **COMPOSTING**

In late 1984, a composting program was begun at the San Francisco's Zoo. It composts zoo animal manure and bedding material to produce a product called "Zoo Doo". "Zoo Doo" is packaged in attractive, colorful 2 lb bags for retail sales. The marketing of the product will emphasize its novelty to generate sales.

The animal waste is composted using the static pile method. The animal waste is piled into windrows, monitored for temperature and moisture, and turned periodically to ensure complete composting of the entire pile. After 4-6 weeks of composting, the piles are shredded and stored in windrows again for a week or two of final curing. After the curing process, the prod-

uct is screened to ensure a homogeneous fine grained product for bagging. The larger particles that were screened off before bagging are mixed back into compost windrows for further breakdown.

A second composting project is in the planning phase. This project will compost tree trimmings, leaf litter, and grass clippings from Golden Gate Park in San Francisco. The compost produced by this proposed program will be used as a mulch or soil conditioner within Golden Gate Park, and at other City parks and golf courses.

### **METALS RECYCLING**

The metals recycling program diverts old appliances, white goods, auto parts, etc. from the waste stream. It has been done for many years and is complimentary to other diversion programs, particularly waste wood recycling. Besides reducing waste volume, removing metal also reduces wear and tear on compactor equipment in the transfer station and landfill.

The program diverts metal items into a separate area as they come into the City's transfer station. This is easily done because most metal items are large and readily identifiable. Many communities throughout the nation have similar programs.

### **PUBLIC EDUCATION**

A large part of what the City does to increase recycling is inform the public about the location, hours, and materials recycled at all of the recycling centers within the City and County limits. The City's public education program does not just focus on giving information about recycling programs, it also attempts to change public habits and behavior. The promotional material produced by the program give practical tips on how to prepare and store recyclables, and thought-provoking facts about why recycling is important.

Recycling opportunities are available and convenient for most residents. Therefore, the challenge of the public education program is to get the public to utilize the available services. The approach has been to target advertising at the specific neighborhoods in which recycling centers are located.

In 1986, the City will experiment with focusing its public education program on various cultural groups. San Francisco is a very culturally diverse city with over 40% of the population made up of nonwhite ethnic minorities. There are also several subcultures that will be given special attention in 1986. It is hoped that a greater awareness of recycling, and increased

recycling behavior outside the traditional white middle class subculture group will be attained by the experiment.

The media used by the public education program include: newspaper display advertising, brochures, door hangers, bus signs, radio and television press conferences and/or public service announcements, direct mailings, and utility bill inserts. Radio advertising was tried, but did not receive enough response to justify the expense.

Localized and specific public education material have been the most cost effective. A survey of people at recycling centers showed that the most effective types of advertising are: street signs, door hangers, phone book, bus, and newspaper advertisements in that order.

## SCHOOL EDUCATION

Educating school age children is initially a very high cost and time consuming project. But, for long-term effect, it is the most positive method of increasing prorecycling behavior. School education programs should be developed carefully and with the assistance of in-classroom teachers. The materials must be accurate, and offer a range of opinions from which students can choose to model their behavior. The materials developed must also be easy and convenient to use, otherwise teachers will find them too difficult to incorporate into their lesson plans.

The recycling education curriculum materials developed for San Francisco were designed and tested by active local school system teachers. The book of curriculum materials is designed for use in grade levels K through 12. An interdisciplinary approach was utilized, teaching recycling concepts through science, math, history, language and art, and craft classes. Also, as an integral part of the program, students are encouraged to recycle in their classroom and at home.

Local recycling businesses are very active in the program. They provide collection containers for materials recycled at the schools and free pick service. Tours of the local recycling plants and the City's garbage transfer station are also provided free to the school system to give students a first hand look at what happens to discarded or recycled materials.

School education programs are important because they build a foundation for the growth of recycling in the future. Furthermore, educating students today to the complex issues inherent in solid waste management

will assist with the development of well thought out solutions in the future.

## SUMMARY / CONCLUSION

Successful City-sponsored recycling programs must be comprehensive, integrated, diversified and flexible to reduce the waste stream with maximum recycling, without displacing existing recycling businesses. Diversity and flexibility also help cities withstand market swings without suffering severe damage to their overall program. The recycling business is a very complex and dynamic field. If a city does not carefully plan and implement new programs, large financial losses and/or loss of entire programs can result. Furthermore, a city can damage the secondary commodities market structure for private businesses already established in the field, causing a net loss of recycling in their area.

The San Francisco Solid Waste Management Program has approached recycling through a carefully planned process that utilizes the existing recycling business structure to increase recycling opportunities for the commercial and residential sector. Through the years, the City's efforts have created a diversified and multi-layered set of programs that compliment one another.

The other avenue taken by the City to increase recycling in the short and long term is to educate the public to the need for recycling, where the recycling opportunities are in the City, and how to prepare materials for recycling. Many people are already predisposed to recycle and only need to be told how, where and when.

To achieve long-term commitment to recycling, school children are taught a new attitude toward waste. They are educated to the costs, economic and environmental, of current waste disposal methods, and how they can be modified. Students are also taught new habits in relation to their consumption and disposal of goods.

Recycling waste as opposed to just throwing it away takes some basic habit changes. Reaching children in schools and teaching them good recycling habits while they are young insures better and more committed adult recyclers in the future.

**Key Words:** Material Recovery; Recycling; San Francisco; Source Separation; Volume Reduction; Waste Control