BAY CITY MUNICIPAL REFUSE PROGRAM STUDY

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April 13, 1998

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FOREWORD

Steven Douglas Flores, a graduate student from the University of Michigan School of Public Policy, authored the enclosed report. The project was supervised by Dean John R. Chamberlin and the Project Director and Principal Investigator was Marlowe J. Greenberg. Technical guidance was provided by Resource Recycling Systems of Ann Arbor, MI.

INTRODUCTION

The City of Bay City, Michigan wants to change its refuse program from a municipal system funded through a property tax levy and a $2.00 per month recycling charge, to a program of cost recovery, fee based services for a comprehensive array of refuse pick-up and recycling alternatives.

In preparing this report, we analyzed three aspects of refuse disposal: how to encourage source reduction, how to introduce greater equity into the payment structure for services, and what are the programmatic alternatives; such as "pay as you throw" and volume subscription plans.

Our study assumes that any program implemented should effectively cover costs, provide improved customer service, and be able to further the City's goal of increased customer service and responsiveness to its citizens.

Additionally, any new program should strive to promote the participation of Bay City residents in the recycling effort.

According to the 1997-98 Budget Review, the City of Bay City collects refuse services for 12,900 single residential homes, 3,065 multi-unit dwellings and approximately 1,500 businesses. The total number of customers served (residential units and business) total 17,465. The total 1997-98 budget for the sanitation department is $1,442,673.

RECOMMENDED PROGRAM

It is recommended that Bay City implement a modified, weekly "pay as you throw" refuse program that includes a comprehensive, weekly recycling service. Such a system should allow the City to control costs, encourage the reduction of refuse contributed to the waste stream, and increase residential participation in the recycling program.

Recycling Program

The proposed enhanced recycling program encourages residents to recycle as many materials as possible. This would allow people to increase recycling and divert more materials out of the waste stream. A recommended list of materials that should be recycled weekly follows:[1]

GLASS: Separate container for brown, clear and green glass bottles and jars such as food jars and beverage bottles.

Items not accepted: Ceramics, coffee mugs, cookware, drinking glasses, dishware, light bulbs, mirrors, bottle caps, metal lids, fluorescent lights, electronic tubes, glass art, blue glass, and windows.

MIXED PAPER: Separate container for brown paper grocery bags, catalogs, cereal and cracker boxes (w/o liners), colored paper bags, colored paper, computer paper, construction paper, envelopes (plastic windows okay), junk mail, magazines, paper egg cartons, shoe boxes, telephone books, and white ledger paper.

Items not accepted: Newspaper, ads printed on newsprint, cardboard, pizza boxes, frozen food packages, facial tissue, plastic liners from food packaging, paper plates and utensils,

[1] GreenTeam of San Jose. "Recycle Plus!" *http://www.greenteam.com/recycle.html,* Last Update: April 23, 1996.

paper napkins and towels, foil gift wrap, wax paper, blueprint paper, carbon and carbonless paper, sanitary napkins and tampons, or books with hard covers.

NEWSPAPER: Separate container for newspaper, newspaper inserts, coupons, and store advertisements printed on newsprint.

Items not accepted: Rubber bands, plastic bags, brown paper grocery bags, cardboard, newspaper dirtied by pet waste, paint, or grease.

MIXED RECYCLABLES CONTAINER: The following items can be mixed together in a large clearly marked container (a 32-gallon garbage can is ideal).

- Cans -- Empty beverage cans, food and soup cans, fruit and vegetable cans, clean pet food cans, soft drink cans, empty aerosol cans.

Items not accepted: No cans contaminated with dirt, food or rocks, aerosol cans that are not empty.

- Cartons -- Emptied and flattened juice boxes and milk, cream and non-dairy cartons.

Items not accepted: No foil wrapped beverage packaging, frozen food packaging, or plastic straws.

- Plastics Numbered 1-7 -- Clean and empty beverage, bleach, catsup, yogurt, butter, cleaner, cooking oil, detergent, liquor, lotion, motor oil, mouthwash, shampoo, soft drink and syrup bottles; milk and water jugs; "take-out" plastic food containers; plastic buckets; empty flower pots.

Items not accepted: No garden hoses, microwave trays, and tubs. No toys (unless marked 1-7), toothpaste or ointment tubes, or syringes.

- Plastic bags -- Grocery bags, dry cleaning bags, clean, dry and empty vegetable bags/fruit bags, bread bags.

Items not accepted: No plastic bags contaminated with food, plastic wrap, cellophane bags like spaghetti and cookie bags, snack food bags, plastic tarps, or plastic department store bags.

- Polystyrene -- Polystyrene "peanuts" or "popcorn" (tied in a clear plastic bag): foam packing (for example, hard foam packing around stereos or computers), food packaging (like egg cartons and meat trays).

Items not accepted: No bubble wrap, saran wrap, plastic utensils, and food waste.

- Scrap Metals -- Small metal household items that fit easily in the mixed recyclables container, clean aluminum foil and pie pans, frozen juice lids, metal can lids and caps from glass bottles, hubcaps, metal pots and pans, empty dry metal paint cans, and small "metal appliances" that cannot be donated to charitable organizations.

Items not accepted: Hangers, engine parts, helium, propane or gas tanks, nails, cast iron, plastic webbing from lawn furniture, appliances with plastic casing, car parts containing hazardous waste, guns, knives, ammunition, or items too large to fit in the mixed recyclables.

- Textiles -- If possible, residents should be encouraged to donate used clothing and other items to charity. However, clean clothing, blankets, sheets, cotton fabric, fabric scraps, polyester fabric, and rayon fabric should be accepted.

Items not accepted -- Shoes, carpet, pillows, stuffed animals, rubber, rugs, boots, oil paint, leather, accessories, nylon clothing, plastic clothing, or rags and textiles soiled with chemicals.

CORRUGATED CARDBOARD -- Cardboard should be flattened and placed against recycling bins (not inside). Most areas recommended that piece be no bigger than 4 feet by 4 feet.

USED MOTOR OIL -- The dumping of used motor oil is becoming a residential problem in many areas. Special "gallon-milk" type containers should be provided and picked up by the City for residents who want to dispose of used motor oil.

Items not accepted: Do not mix the oil with anti-freeze, transmission fluid, water, or any other liquid or solids. Do not recycle empty City-issued jugs in the recyclables container.

According to the 1995-1999 Bay City Recycling Plan, Bay City would like to avoid major capital expenditures when implementing its recycling program. However, to implement the recommended comprehensive recycling program, the City would likely need to invest in more equipment and labor.

A preferable alternative might be to attract a commercial waste and recycling company to provide the City with a more comprehensive program without an increase in capital expenditures. According to the contracts that other cities have with commercial recycling companies, the current $2.00 fee charged by Bay City is within the fee range necessary to provide the recommended recycling services. Due to the convenience and availability of disposal options, it is critical to note that "curbside recycling pickup increases the probability of recycling more than does unit pricing of garbage."[2]

Additionally, the proposed list of recyclable materials is meant to serve only as a model of what additional items can be included in an expanded residential recycling program. The items that local recycling facilities accept varies, therefore the City of Bay City may not be able to recycle items like used motor oil, textiles, and scrap metals.

[2] Fullerton and Kinnaman. "Household Responses to Pricing Garbage by the Bag." *The American Economic Review*, September 1996, p. 971.

Refuse Program

Offering such an extensive array of materials that can be recycled leaves few items to be taken to landfill. However, there will still be items that will not fit into any of the recyclable material categories. Items like food wastes, paper plates, pizza boxes, diapers, sanitary products, pet wastes, light bulbs, facial tissue, and non-recyclable plastics will still need to be disposed.

These items should be disposed of by using a hybrid of a bag and tag and subscription can system. Each household should be required to pay for one 32-gallon can of refuse service per week (in conjunction with the recycling program). 32 gallons is the standard size for residential refuse containers. This refuse disposal will be a part of the "basic service" provided by the City to every household. Residents who wish to dispose of more than 32 gallons of refuse per week, must purchase "garbage tags" that will be sold to them by the City.

A resident can then place a tag on each extra bag of refuse they wish to dispose. The fees charged for the garbage tag will essentially cover the cost of the bag's disposal. This structure will also allow the City to predict a base-level revenue flow and match program revenues with program costs. Furthermore, this pricing structure serves the consumer's need by allowing the resident to choose the level of service they want to receive from the City.

PROGRAM FUNDING

Currently, Bay City imposes a 2.86 property tax millage on all residential, industrial and commercial properties to cover the costs of residential refuse collection. The City should strongly consider eliminating this tax altogether. Instead, Bay City should consider a cost-recovery billing system to charge its residents more effectively and equitably for refuse service.

According to City sources, the actual budget for the City's residential refuse collection was $1,442,673. However, the City only collected $1,234,369 from the refuse millage. According to the City's Finance Department, Bay City projects additional revenue of $355,000 from the $2 per-month recycling fee. As a result, the City's sanitation budget has a slight surplus of $146,696. Even though Bay City's Sanitation Deptartment expenses are effectively covered by its dedicated revenue sources, the City should devise a price structure for refuse services that would directly charge residents for the services they receive as well as solving other funding inequities.

The refuse millage is imposed on both commercial and residential properties. Residential properties make up approximately 64% of the tax base, while commercial and industrial properties comprise the remaining 36%. The collected revenue funds only residential refuse collection. Although owners of commercial properties may enjoy some social benefit from the assurance that residential refuse is collected, it is an inequity of the current system that most non-residential property owners do not receive any direct municipal service for the tax dollars they pay.

This inequity is underscored when one considers that the residential property owners' refuse millage only covers approximately 55% of the Sanitation Department's budget. Thus, the residents of Bay City are essentially receiving a subsidized refuse service.

Residential Refuse Millage	Total Sanitation Budget	%-age Covered by Millage
$786,768	$1,442,673	55%

Another inequity with the current billing system is its basis in property values. Those who own valuable homes pay more for their refuse collection than those who own less valuable property. For example, a single person may live in a large house valued at $200,000 that has been owned by his or her family for generations. Conversely, a young couple with three small children may live in a home valued at $100,000. Under the current property tax millage system, the young couple will only pay $256.00 per year in property taxes for garbage service and the owner of the older house would pay $572.00 each year. Considering that the occupant of the more valuable home would also likely produce less refuse than the family, the billing system becomes even more inequitable.

The major budgetary constraints placed on the City's sanitation department come primarily from the fixed and operating costs of the refuse program. The budget for items other than tipping fees, such as maintenance, equipment rental and operation, and employee salaries, comprise more than 60% of the department's budget (the recycling program budget is not included). For the purpose of this analysis it is assumed that these costs are fixed. As a result, there is little room to reduce or alter these Sanitation Department budget items. It is fair for the City to spread the cost of these budgetary items evenly over all households since the cost to provide this portion of the refuse program does not depend on usage.[3]

[3] Note that the monthly cost per household does not include the disposal cost for the 32-gallon can that is a part of the proposed basic service.

Total Fixed Sanitation Dept. Costs	Monthly Cost per Unit
$707,426	$3.38

A city government has greater control over the markets to which it provides services than do most private enterprises. There are 17,465 customers served by the Sanitation Department in Bay City. The City can legally require each of these customers to pay a basic service fee for refuse services. We believe this fee should cover the average total fixed cost of providing refuse service. At this time, the amount each household pays varies due to the property tax collection method. We know that together, the refuse millage tax revenues and the recycling fee, allow the City to cover total program costs. Bay City can cover the average total fixed cost of the proposed program by dividing the costs of providing "basic service" to all residents by the number of customers served. This basic service fee will include the cost of disposing of 32 gallons of refuse weekly, per household.

Total Cubic Yards of Refuse sent to Landfill	Total Annual Tipping Fee	Number of 32 gallon bags per compacted cubic yard	Cost per 32 gallon container
36,000	$453,240	18 to 24	.53 to .70

The marginal cost associated with this program is the cost of disposing the refuse. It is assumed that this cost is the fee that landfills charge for dumping (tipping fee). At this time, the state of Michigan has more landfill space than needed. This abundance of landfill space has caused tipping fees for most Michigan cities to remain very low. Thus, Bay City does not face a budgetary need to reduce the quantity of garbage created by residents. As a result, the City has never imposed a limit on the amount of refuse a household can dispose of each week.

The City uses rear loader trucks. According to estimates provided by Resource Recycling Systems in Ann Arbor, MI, rear loader trucks compact refuse to a density of 700-1000 lbs. per cubic yard. Budget data from the City reveals that Bay City sends 36,000 cubic yards of refuse to landfill each year.

Thus, the City's residents send a total of 25,200,000 to 36,000,000 lbs. of refuse to landfill each year. This breaks down to approximately 1.8 to 2.5 lbs. of garbage per resident each day. According to Resource Recycling Systems, the average amount of waste generated daily in the state of Michigan is 2-3 lbs. per person. The Bay City average is well within this range.

Even though the residents of Bay City are within the Michigan average, the City and its citizens must realize that there may be negative externalities associated with refuse disposal. In the long run, as landfill space does eventually fill up, the City could face a capacity problem. The City's leaders and managers understand this problem and have expressed the explicit desire to reduce the amount of trash Bay City contributes to the waste stream. According to Fullerton and Kinnaman (1996) and the City of San Jose, programs like the one proposed here have been cited as reducing 10-45% of the community's waste stream respectively. The City of Bay City's annual savings can range from $45,000 - $203,000 if it experiences similar results.

The final cost to consider for residential refuse service is that of curbside recycling. Bay City imposes a $2 fee on all residents' monthly utility bills to cover the cost of citywide recycling. According to the City's Finance Department, projected annual revenues for the services total $355,000. The annual cost of the program is currently $282,007. There is a surplus under the current service level and pricing scheme. However, this surplus helps cover the cost of providing refuse services other than recycling.

As stated previously, the $2 recycling fee should be close to the estimated cost of offering the suggested recycling program. The total monthly cost for the proposed refuse service is listed below.

Proposed Refuse and Recycling Basic Service Fee

Fixed Cost per household	Monthly Cost to provide 32 gallons of disposal to each household	Monthly Recycling Fee	Estimated Total Monthly Cost per household	Estimated Price for Extra bag or tag
$3.38	$2.30 to $3.03	$2.00	$7.68 to $8.41	$.53 to $.70

PRICING AND DISTRIBUTING GARBAGE TAGS

Occasionally residents will have more garbage than the 32 gallons allotted by the basic service. To accommodate these occasional overflows, residents should be able to buy special extra garbage stickers to attach to a 32-gallon plastic garbage bag. Most areas that use bag tags prefer that residents place the refuse in a bag instead of an extra can so that the sanitation department workers can easily identify the extra refuse. However, other cities such as Falmouth, ME, actually distribute bags instead of tags to sell to residents who need to dispose of extra refuse.

Regardless of whether a city sells tags or bags, they seem to price and distribute the items in similar ways. First of all, pricing almost always includes the direct cost of tipping fees. Some will also include the administration cost and collection cost into the bag or tag fee. However, because it is recommended that Bay City include the cost of collection and administration within the Basic Service fee. As previously stated, the cost of providing this portion of the refuse service is the same for each household regardless of the volume of trash each household produces, thus increasing the equity of the system.

Most cities distribute their bags and tags similarly. Stickers are sold at a combination of municipal offices (City Hall, Libraries, other offices) and local supermarket and retail stores. Some cities even allow retail sellers to mark up the price by 2-3% to cover their own costs as well.

ILLEGAL DUMPING

One of the biggest concerns that policy makers have when they consider going to a unit-based refuse system is illegal dumping. As residents realize that they will be charged for the waste they set out on their curb, some will illegally dump or burn trash to avoid the extra expense.

When no enforcement measures are taken, some studies show that illegal dumping can "constitute 28 percent of the total reduction in garbage at the curb. For comparison, additional recycling alone constitutes a 38 percent of the total reduction in garbage."[4]

However, illegal dumping does not always result from a change in refuse systems. The EPA cites three cities and their reaction to illegal dumping after they switched refuse systems.

> Concern over illegal dumping and burning is often cited as the major barrier to acceptance of pay-as-you-throw (PAYT) programs. Many communities charging a variable rate for trash services point out; however, that they have not observed significant increases in these activities. For these cities and towns, education and enforcement have been the most effective ways to prevent illegal diversion.
>
> In Mansfield, Connecticut, officials report that illegal dumping did not increase significantly with the introduction of a PAYT system. To prevent illegal dumping, Mansfield has relied primarily on public education. When necessary, however, the solid waste department also has worked with the police department to track license plates and identify violators.
>
> Seattle, Washington has also found no association between implementation of PAYT and an increase in illegal dumping. In fact, 60 to 80 percent of the illegal dumping incidents in the city are associated with remodeling waste, old refrigerators, and construction debris—waste that the city suspects comes from small contractors who do hauling on the side.
>
> The city of Pasadena, California reports similar findings. A survey conducted at the city's landfill indicated that Pasadena was disposing of

[4] Fullerton and Kinnaman. "Household Responses to Pricing Garbage by the Bag." *The American Economic Review*, September 1996, p. 978.

> one-third more trash than was indicated in a waste generation study completed in the city. Pasadena suspects that this waste is made up of construction and demolition debris dropped off by small contractors.[5]

There are several simple measures that can be taken before implementing a new pay-as-you-throw system that can help prevent a potential increase in illegal dumping. They are:

1. Require businesses to lock all commercial dumpsters.
2. Vigorously enforce and publicize illegal dumping laws in the first months of the program.
3. Request that sanitation employees report households that do not put out curbside waste.
4. Require each household pay for a one bag or can minimum.

[5] United States Environmental Protection Agency, *"Three Cities Report on Illegal Diversion."* http://www.epa.gov/epaoswer/non-hw/payt/top8.htm#three, Last Updated: December 19, 1997.

POSSIBLE CONCERNS AND/OR QUESTIONS[6]

Would this system utilize bags or cans for refuse?

The answer is both. The City can require that residents use 32-gallon cans for the basic service but will allow bags to be utilized for the "overflow". The system should try to encourage residents simply to utilize the basic service while the additional tags could be purchased to accommodate refuse disposal for times when a household has more refuse (i.e. after a party, spring cleaning).

How do we bill for multi-family housing units?

Bay City could consider charging property owners of multi-unit housing complexes for residential refuse. The landlord can then effectively pass the cost on to tenants in their rent. The City may also simply use the same system employed to collect the current recycling fee. If the City is going to continue to pick up the refuse of the estimated 1,500 businesses, they should be charged for the service as well.

What do we do about families who can't afford a more expensive service?

Each city must determine for itself which families need assistance in order to afford this service. For example, some cities offer free tags or service to recipients of general assistance. Others offer rebates, coupons, or discounts to those who demonstrate financial hardship.

How do we approach those who perceive refuse services as a "free service" and now see the unit pricing as a new "tax"?

The key here is to educate residents about the reasons for the system's change. If prices appear to be reasonable and residents understand the rationale behind the policy, a new system is easier to implement.

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[6] United States Environmental Protection Agency, *"Pay As You Throw FAQ."* http://www.epa.gov/payt/faq.htm, Last Updated: December 19, 1997.

Does it matter if residents stuff more garbage into the same container to avoid paying for garbage tags?

The best way to prevent overstuffing is to set weight limits on containers. During the first weeks of the program, employees should continue to accept overstuffed containers but leave "courtesy notes" behind to notify residents of the weight limits.

Shouldn't the City just privatize its garbage system?

Many cities throughout the United States have chosen to eliminate municipal refuse programs and have hired private haulers to provide residential refuse service. Most cities claim that there are significant savings made by privatizing this service. The most effective way for the City to determine if privatization is an option for them is advertise a request for proposals from commercial haulers as well as from the City's own staff. Furthermore, the information gained can serve as a benchmark for the City to operate in a more competitive manner.

What should the City do with the commercial and industry portion of the tax?

Currently, local business must contract out for their waste disposal needs. The City may want to consider leaving the commercial and industrial portion of the refuse millage intact. The City could then offer the elimination of the tax as an economic incentive for businesses to start recycling.

Are there any other items to investigate?

Some large cities "franchise" the exclusive commercial and industrial refuse rights to one private refuse and recycling company. Many times the negotiated contracts will include provisions that require the commercial hauler to provide other added services for the city. For example, Bay City might consider franchising the commercial and industrial refuse rights and include residential recycling as part of the contract. This type of contract might lower commercial and industrial refuse costs as well as the cost for residential recycling.

CONCLUSION

We recommend that the City of Bay City consider a direct cost-recovery, one-fee recycling and refuse system. To fund the refuse and recycling program, the City should bill residents directly for the cost of the program each month. Residents would receive a basic weekly refuse disposal and recycling service that is the same for all households at a monthly cost of $7.68 to $8.41 per unit served. The fees paid by each household would be equal to the residents' usage of the service. Overflow garbage bags or tags could be priced between $.53 and $.70 per bag. The City could expect the quantity of materials sent to landfill to be reduced through the implementation of the new pricing structure along with the expanded curbside recycling system.

To be equitable, Bay City should eliminate the residential refuse millage for commercial, industrial, and residential property owners. The tax's elimination could return more than $447,800 to the Bay City business economy.

The City of Bay City appears committed to reducing the volume of trash residents contribute to the waste stream as well as creating a billing system that is equitable and service-based. This plan allows the City to accomplish those goals while maintaining a consistent service level and near revenue neutrality.

CALCULATIONS

The Bay City population: 38,936

The total number of customers served (residential units and business) equal: 17,465

The total 1997-98 budget for the sanitation department: $1,442,673

Refuse millage revenues: $1,234,369

Monthly recycling fee revenue: $355,000

Total Revenue = 1,234,369 + 355,000 =	$1,589,369
Total Cost =	1,442,673
Budget Surplus	**$146,696**

Allocation as part of Total S.E.V.

Residential	$275,093,978
Commercial	90,501,373
Industrial (inc. Utility)	66,072,400
Total City	**$431,667,751**

Residential Percentage:	275,093,978/431,667,751 = **63.7%**
Commercial and Industrial Percentage:	156,573,773/431,667,751 = **36.3%**

The millage is based on these figures.

Total Budget	$1,442,673
Tipping Fee	- 453,240
Recycling Budget	- 282,007
Fixed Program Costs	**$707,426**

Fixed Program Costs as a Percentage of Sanitation Department Budget:

707,426/1,160,666 = 61%

Monthly Fixed Fee Per Customer

707,426/17,465 = 40.50/12 months = **$3.38 per month**

Daily Refuse Disposal per Person

700 lbs. per cu. yd. * 36,000 cu. yds. per year = 25,200,000 lbs. annually.

1000 lbs. per cu. yd. * 36,000 cu. yds. per year = 36,000,000 lbs. annually.

25,200,000/38,936 = 647.22/365 days = **1.77 lbs. per day**

36,000,000/38,936 = 924.59/365 days = **2.53 lbs. per day**

Tipping Fee Reduction Savings

Tipping Fees	$453,240
10% reduction	**$45,324**
45% reduction	**$203,958**

Recycling Program Budget Surplus

Projected Annual Revenues	$355,000
Annual Program Budget	$282,007
Recycling Budget Surplus	**$ 72,993**

Economic Benefit to Business due to the elimination of the millage

Commercial S.E.V.	$90,501,373
Industrial S.E.V.	$66,072,400
Total	**$156,573,773**

$156,573,773 * .00286 (millage) = $447,800 in Business millage