

Solid Waste Management in the City of South Tucson

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Executive Summary

Local municipalities in the United States are increasingly concerned about how and where we are going to dispose of our trash without generating unmanageable costs. The phenomena of increasing land prices, stricter national environmental protection regulations and landowners that are unwillingly to live next to a dump are forcing costs through the roof, in turn, this is draining municipal budgets which are not prepared for the changing solid waste industry. These fiscal drains and stiffening regulation are forcing local legislators to modify the way in which they treat solid waste disposal. Cities and towns are setting up systems that treat waste as a utility that is paid for incrementally and based on usage.

This report provides a broad overview of the solid waste disposal in the United States including a brief history, and a synopsis of solid waste disposal policies at the national and state level. Long-term solid waste management concerns and a discussion of current programmatic trends (including Enterprise Funds, Pay As You Throw (PAYT) systems) and complementary services (such as recycling and green waste pickup) are discussed in detail. The City of Tucson's solid waste policies are used as a framework for the possible restructuring of the smaller municipality, the City of South Tucson's Sanitation Services. Current sanitation practice in the City of South Tucson and preliminary findings for the FY 2002-03 Sanitation Services cost benefit analysis demonstrate the need for in-depth documentation of all revenues and expenditures. Programmatic and fiscal recommendations for the City of South Tucson include the tracking of all Sanitation Services revenues and expenditures (Base Study), the formation of a self-standing Sanitation Services enterprise fund, the implementation of once a week

trash pick up with the integration of complementary services (recycling and green waste), and the eventual implementation of a Pay-As-You-Throw fiscal program. It is recommended that these fiscal and programmatic changes be actuated on an incremental basis, which is dependent on the findings of the Sanitation Services Base Study.

An in-depth understanding of the long and short-term solid waste issues will guide the Mayor and Council of the City of South Tucson in making an informed decision on potential policy changes that could enhance the current program while ensuring the program's fiscal accountability.

I. Solid Waste Management

Solid waste is a growing problem; skyrocketing land prices coupled with increased environmental protection and a NIMBY (Not In My Backyard) phenomenon are forcing the municipal landfills farther out of the city and solid waste costs above and beyond the traditional prices. In order to understand the future implications and make an informed decision on solid waste it is necessary to review the history of solid waste management, long-term concerns linked with solid waste disposal, and current programmatic trends. This background information will provide an understanding of solid waste issues from a macro to a micro level.

A. History of Solid Waste Management

Mankind has been producing, and disposing of solid waste since the beginning of time. Low populations in agrarian communities left individuals in charge of household solid waste with no long-term consequences. With the development of the first urban centers came increased population densities and increased trash, making sanitation regulations essential to ensure proper disposal. Athens, the first known city to have enacted waste disposal regulations in 500 BC, forced garbage collectors to dump trash at least one mile away from the city walls whereby preventing inhabitants from throwing trash into the streets (Meloski, 1981). Roman culture developed organized “garbage men” that used horse-drawn wagons to pickup all discarded waste, except fecal matter that was illegal to dispose of in carts and open pits (Kelly, 1973). The decay of the Roman civilization pushed city dwellers out to the countryside, and urban centers shrank considerably. Low urban population levels in the Middle Ages all but halted organized

waste disposal. It was not until the late 15th Century did people begin to return to the city, causing increased solid waste, which began to deteriorate general living conditions. In response to these poor conditions, municipal governments assumed responsibility for health and safety, specifically when trash interfered with a city's drainage and defense system. It was not until the Industrial Revolution (the end of the 18th and beginning of the 19th centuries) did the way society and communities look and change forever. This era saw immeasurable economic expansion coupled with vigorous urbanization. A rush of rural citizenry left the countryside in search of power and wealth in urban centers. The urbanization phenomenon is especially visible in England, where population shifted from rural settings to urban centers with 77 percent of the 36 million people living in cities (Meloski, 1981). Industrialization increased all types of pollution including air, water and solid waste in turn severely affecting urban living conditions. At the time there was no scientific evidence that a dirty living environment lead to increased disease; however, it was understood that trash was a problem in urban areas. This resulted in a sanitation movement that pushed governments to create trash management rules and regulations. An 1869 establishment of the Sanitary Commission enacted a set of public-health laws that instated sanitation programs leading to a reduction in urban disease (Meloski, 1981). Sanitation program developments in England spurred a worldwide trend towards improved solid waste management.

In the United States a lack of basic structural and political infrastructure set it behind other nation states in the development of public sanitation systems; until the early 1800's American cities lacked organized public works for street cleaning, refuse collection, water treatment and human waste removal (Louis, 2004). In the late 1800's

regional water treatment and sewage facilities were prioritized, in effect draining regional capital funds. Lack of regional funding shifted solid waste disposal responsibility on to municipalities who used water bodies (lakes, rivers, harbors, and the open sea) and available land to dump trash. The easiest and therefore the majority of solid waste in this era was dumped into waterways. US waterways became so polluted by 1899 that Congress passed the Rivers and Harbors Act (RHA) that charged the United States Army Corps of Engineers with restricting solid waste dumping into lakes, rivers, harbors and the open sea, for the protection of human health and to ensure the navigability of waterways. This regulation coupled with an increase of available material goods and a clear scientific understanding of how bacteria are connected with communicable disease, resulted in a sharp increase in open dumps throughout the nation.

In America, “scarcity was the rule, and families saved, mended and reused old materials out of ordinary but necessary habit. When industrialization took hold in American cities through the 1800s, peddlers fanned out to the valleys, hollows and prairies where most Americans lived, bringing them teapots, wire, farm tools, soap, cookware and all manner of new manufactured goods, many of them formerly produced by women at home”(Strasser, 1999).

The sheer quantity of solid waste became so daunting that municipalities sought out alternatives to reduce waste volumes. The first U.S. garbage incinerator was built in 1874 on Governor’s Island in the New York Harbor. The first recycling program followed in 1897 in New York City which significantly reduced waste, in turn creating financially self sufficient programs (Melosi, 1981). Burning waste reduced the volume to 1/10 of the original amount, yet the ash was disposed of in the same manner, open dumps. Open

dumps, commonly uncovered were smoldering pits of trash, overrun by flies, rats and spewing smoke into the air.

Material scarcity of the 19th century was transformed by industrialization resulting in a plethora of available goods by the 20th century. In the 1940's, a dramatic increase in affordable and disposable goods resulted in skyrocketing quantities of solid waste. To effectively manage the increased quantities, basic collection requirements were established and served as the best practices in the refuse field. In 1948, the national concern over the rampant spread of polio, prompted United States waste officials to ban open-burning dumps, which were considered a major agent for communicable diseases. Issues of health and safety spurred legislation that established a nationalized system for landfills.

A concern for environmental conservation and preservation emerged in the early 1960's. With Rachel Carson's 1962 *A Silent Spring*, public awareness that nature was vulnerable to human intervention and that industry needed to be regulated in order to protect the environment became widely accepted, and environmentalism was born (NRDC, 1997). This new era brought forth a generation of laws and policies aimed at protecting the natural environment.

B. National Solid Waste Policies

The precedent setting national acts and Environmental Protection Agency (EPA) initiatives are discussed in the following section. These policies outline the increasing involvement of the national government in solid waste management, and the steady progression to source reduction and recycling policies.

The Solid Waste Disposal Act (SWDA) passed in 1965 was the first national policy to deal with solid waste management practices and marks the beginning of federal power over solid waste policies. SWDA legislation focused on training seminars, research, and pilot projects to promote new landfill technology. SWDA was only mildly successful as the regulation lacked teeth and funding; as a result states failed to engage in solid waste management planning.

The 1970 passing of the National Environmental Policy Act (NEPA), redefined the federal government's responsibility to regulate man's relationship with the natural environment. Section 101(a) [42 USC § 4331] states:

The Congress has identified the profound impact of man's activity on the natural environment. Particularly they have noted the influence of *resource exploitation* recognizing the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man. This policy states that the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, will use all practicable means and measures...in the creation and maintenance of a system in which man and nature can exist in productive harmony, while fulfilling social, economic, and other requirements of present and future generations of Americans.

NEPA forced all agencies of the federal government to integrate environmental concerns into their planning and decision-making (Ortolano, 1997).

Six years later in 1976, the Resource Conservation and Recovery Act (RCRA) sealed the federal government's role in regulating solid waste management. RCRA legislation provides a basic outline of pertinent waste management issues, i.e. protection

of the health and safety of American citizens and the importance of source reduction (less waste).

Specifically, RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. RCRA's primary goals are to: 1 - protect human health and the environment from the potential hazards of waste disposal, 2 - to conserve energy and natural resources, 3 - to reduce the amount of waste generated, 4 - to ensure that wastes are managed in an environmentally sound manner (EPA, 2003).

RCRA assigned the EPA with the responsibility to set, enact and monitor solid waste management policies and regulations that will achieve the above-mentioned goals (EPA, 2003). This marks a shift from the past where solid waste management has historically been a state and local function. This legislation granted EPA the power to control landfill standards, determine whether state permit programs are in compliance with the federal revised criteria and obligated States to inventory open dumps, bring them up to standards, or shut them down. (Subtitle D, Non Hazardous Waste).

In the 1980's, legislative acts and EPA policies created more progressive solid waste policies that encouraged States and federal facilities to implement conservation practices such as source reduction and recycling. In February 1989, EPA's 'Agenda for Action', created clear-cut goals and objectives for nationwide Municipal Solid Waste (MSW) management. Federal, state, and local governments were encouraged to adopt a waste management approach that combined source reduction and recycling, resulting in effective solid waste management. The Pollution Prevention Act (PPA), passed in 1990, focused on pollution reduction through cost-effective changes in production, operation,

and use of raw materials. PPA promotes protection of the resource base through conservation practices, including recycling, source reduction, and sustainable agriculture. PPA goes so far as to formally define “source reduction” as more desirable than waste management or pollution control.

By the mid 1990’s, the EPA began to approach solid waste reduction through an agency wide focus on creating local level partnerships and promotion of a voluntary compliance model. An example is the 1994 Waste Wise program, which provides free technical assistance to aid departments and agencies in the development, implementation, and monitoring of waste reduction programs. These collaborations with state, local, profit and non-profit organizations aid in the lowering of municipal solid waste and selective industrial wastes; therefore, benefiting the agencies financially and the natural environment (EPA, 2004). The Federal Facility Compliance Act (FFCA) of 1992 amended the 1976 Solid Waste Disposal Act (SWDA) in order to clarify requirements and possible sanctions placed on federal facilities. FFCA mandates that each state must (within 180 days) create an inventory of all existing mixed waste facilities and mixed waste treatment capacities and technologies (Federal Facility Compliance Act, 1992). The FFCA created the first centralized system to track waste accountability i.e. the amount, type, and destination of all solid waste produced by federal facilities. FFCA inventories paved the way for President Clinton’s September 14, 1998, Executive Order 13101, Greening the Government through Waste Prevention, Recycling and Federal Acquisition, which developed a government-wide Waste Prevention and Recycling Strategic Plan. A steering committee was named to track the implementation.

The major points of the executive order are:

- The head of each executive agency shall incorporate waste prevention and recycling into the agency's daily operations.
- The head of each executive agency shall work to increase and expand markets for recovered materials through greater Federal government preference and demand for such products.
- National policy prefers pollution prevention, whenever feasible.
- Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort (U.S. President, 1998).

In the last 40 years, solid waste reduction programs and recycling have made their mark. Even today, the EPA continues to update RCRA ensuring that it is effectively dealing with current solid waste issues. Recent framework modifications include user-friendly formalities, public involvement in decision-making processes and simpler regulations in order to foster compliance. Yet, the lack of a single all encompassing national policy allows gaps at the state and local level creating inconsistencies nationally. The next section explores Arizona's policy on solid waste reduction and recycling.

C. Arizona Solid Waste Management Policies

Arizona Revised Statutes (49-832) define solid waste policy in the State of Arizona. The Arizona Department of Environmental Quality (ADEQ) established the Recycling Program in 1990 empowered by the Arizona Solid Waste Recycling Act (see

A.R.S. 49.831 et seq.). ADEQ shall administer and oversee the enforcement of this article.

ADEQ's policies and mandates are summarized below:

1. ADEQ monitors municipalities and counties for compliance with sections 9-500.07: "A city or town shall provide its residents with an opportunity to engage in recycling and waste reduction" (A.R.S. 49-832) and 11-269: "A county shall provide its residents with an opportunity to engage in recycling and waste reduction" (A.R.S. 49-832).
2. The Arizona Solid Waste Recycling Act provides funding to aid communities in developing recycling programs, aids in finding markets for recycled materials and supports educating communities about the benefits of recycling.
3. By May 1, 1992 ADEQ in conjunction with the State Board of Education, implemented a public education program to increase awareness of individual responsibility for properly reducing solid waste and "to encourage participation in recycling, reuse, and source reduction" (A.R.S. 49-832).
4. ADEQ is responsible for providing technical advice to private and public institutions, sponsoring workshops on recycling/source reduction, administering a statewide database and recycling hotline, promoting conservation techniques, overseeing a research program, coordinating public education and advertising programs and guiding educational institutions so to encourage courses and curricula on recycling and source reduction.
5. ADEQ mandates that newsprint contain at least forty percent recycled-content, if the recycled paper is available at a comparable price, is of reasonable quality, and is available within a reasonable period of time.

6. Under the ARS, ADEQ had to develop a program encouraging plastic recycling by July 1, 1991. Namely all plastic containers must contain a label clearly stating the plastic resin used to manufacture the product.

7. Every solid waste facility (private and public) makes payments to the recycling fund. The fees are based on the amount (volume or weight) of waste and whether the solid waste is compacted or not. These regulations only apply to loads “less than six cubic yards of uncompacted solid waste or three cubic yards of compacted solid waste” (A.R.S. 49-836).

8. The recycling fund receives monies from public and private sources as well as the disposal fees outlined above. All of the “monies derived from landfill disposal fees are subject to legislative appropriation” (A.R.S. 49-837). The monies will be used to provide grants, educational programs (public-technical), and to administer this legislation.

There are three ADEQ annual funding programs including Waste Reduction Assistance [WRA], the Waste Reduction Initiative Through Education Funding [WRITE], and Recycling Research and Development [RR&D]. The program funds are available to any public or private institution that contributes to the ADEQ Recycling Fund. The WRA program focuses on waste reduction, recycling, and composting. WRA funds a variety of projects from new recycling programs or electronics recycling, to green waste such as mulching and composting projects. These funds can be used for capital improvements and/or to expand existing programs. WRITE funds educational programs that focus on waste reduction, recycling, and/or composting. These projects often include school programs, technical assistance, and/or workshops. RR&D dedicates monies to “research, including feasibility studies, solid waste audits and marketing and/or technology development, such as new equipment or processes” (ADEQ, 2004). RR&D

grants increase the local knowledge base promoting recycling, source reduction and composting in the State of Arizona. For each program a Request for Proposal (RFP) is released around February and the tentative award date is July. ADEQ programs normally require matching funds; which can be difficult for small communities with limited funds or for large communities with large capital projects. ADEQ also hosts a website, *Recycle America*, that provides visual aides for teachers, information for children, and general information on recycling. The ADEQ website contains a link to the Earth 911 website for more information. These resources and potential funding for recycling programs should be utilized when implementing new programs or as educational support for existing programs.

Arizona has begun to promote recycling and waste reduction on a statewide basis, although in comparison to others states such as Minnesota or Maryland, Arizona is not perceived as progressive on this issue.

II. Long Term Issues and Current Solid Waste Trends

Solid waste disposal presents a number of long-term issues that affect the way in which communities choose to dispose of trash. Improved landfilling techniques associated with stricter environmental regulations and the Not In My Backyard (NIMBY) phenomena have escalated solid waste costs. Increased costs and environmental consequences have pressed municipalities to implement improved solid waste management programs that focus on source reduction and recycling. Professor William Rathje, Director of the University of Arizona's Garbage Project recognizes this trend stating that, "We should be asking, where does all the garbage come from—and how can we decrease it?" rather than how we can improve landfilling techniques as to not risk communities' health and safety.

A. Landfilling

The majority of waste in the U.S. is dumped into regional landfills that are operated and monitored by local level agencies. EPA regulations have placed strict restrictions on the location of landfills, operation methods, facility design, groundwater monitoring, closure and post closure care and financial revenue assurance. These regulations have increased current operating costs as well as expenses incurred at closure and during a 30-year long-term care period. These costs can be a significant portion of the overall cost of operating a site (O'Leary, 2003). A local example is the City of Tucson's Los Reales landfill, which costs \$7 million annually for landfill operations. Yet, an additional \$30 million will be needed over the next five years to improve the Los Reales landfill, close old landfills, and remove soil contamination related to past

industrial practices or petroleum storage within the City limits (City of Tucson, 2004). This will result in an estimated \$75 million in landfill monitoring, improvement and remediation costs for the City of Tucson in the next five years.

Increasing land values and strict environmental restrictions, coupled with the NIMBY objection that nobody wants a landfill in his or her backyard, make it difficult to locate future landfills. The result of these factors landfill development is being pushed significant distances from urban centers. The further the area landfill is from the urban center, the higher the expected cost for transportation and vehicle wear/tear, further stressing the local municipal budget.

Increased landfill costs are amplified by national and regional economic downturns, a decline in state and federal funding and opposition to traditional revenue sources (local property tax) that have negatively affected municipal cash flows (Hallas-Burt, 2004). The combination of these stresses are pushing decision-makers to develop waste reduction and recycling programs that not only lower the short-term costs but also mitigate the long-term costs of landfill replacement. Even though municipal budgets lack available funding, they continue to provide traditional services such as solid waste management, education, police and fire protection (Hallas-Burt, 2004).

The current trend in solid waste is to implement programs that cut costs, increase revenues and reduce the amount of trash landfilled. The majority of municipalities either have or are funding sanitation services through the general fund. General fund monies are raised in a multitude of ways such as property tax, sales tax, permits or fees. Utilizing general fund monies makes it difficult for municipalities to identify costs associated with specific programs. For example, in the City of South Tucson, the sanitation budget does

not include all supportive services such as accounts payable, accounts receivable, building maintenance, or gasoline costs. These supportive services are paid out of the general fund monies and are utilized by several departments. Increased sanitation costs (tipping fees, truck replacement, gasoline prices) are placing undue pressure on general fund dollars. Current programmatic trends that are occurring in solid waste management to mitigate the problems associated with tax-based funding are namely Enterprise Funds and Pay As You Throw (PAYT) systems that include complementary services such as recycling and green waste pickup.

B. Enterprise Funds

Enterprise funds are financed and operated similar to a private business; the goal of governing officials is that operating costs, capital costs, general municipal support costs and depreciation are fully accounted for and recovered through user fees. Enterprise funds are beneficial to municipalities in several ways. First, the use of enterprise funds will account for all costs related to the sanitation program. Program costs will be recovered by user fees, lessening the drain on general fund monies. Enterprise funding is a more inclusive approach to waste management, and is central to maintaining accurate financial controls (Aspinwall, 1997). Second, government officials may find that it is more politically feasible to establish or raise user charges than to increase property taxes or cut back on governmental services (Bunch, 2000). Third, establishing an enterprise fund allows the municipality to generate capital through revenue bonds rather than general obligation bonds. Revenue bonds unlike general obligation bonds do not count

against the limits on bonded indebtedness, seldom require a public vote and are paid off by user fees (Bunch, 2000; Rubin, 1988).

Overall, enterprises are different from other government services because they support themselves in whole or in part from the income they generate (Rubin, 1988) and not surprisingly, revenues associated with most types of enterprise funds have increased at a faster rate than general fund revenues (Bunch, 2000). In an age of competition the implementation of enterprise funds, allows local governments the ability to compete effectively with the private sector (Stoner, 1997) while providing a better service at a cheaper cost. The following steps are essential to enterprise fund program development;

1. Identify and capture all source data – costs (salaries, equipment, fuel, etc.) as well as the assets and liabilities that will be transferred into the fund.
2. Establish internal controls (duties and responsibilities should be clearly separated).
3. Design reports to control and manage information (financial, operational [vehicles, wastes], labor).
4. Provide for an ongoing review. (Yanke, 1997).

C. Pay As You Throw

Pay As You Throw (PAYT) is a type of enterprise fund that uses a variable rate or unit price system replacing the traditional tax-based or flat fee per household rate. PAYT charges user fees based on the quantity of trash that the specific household is disposing of. The traditional tax based and flat rate systems have been closely scrutinized because of the inequitably (a single senior pays that same as a family of four), and disincentive to reduce waste (every household is left with a marginal (extra) cost of zero for every

additional unit of solid waste they produce). Under the PAYT system, a city's increasing revenues derived from incremental fees cover its solid waste costs. On the contrary, under a tax-based or a flat fee system, when residents generate more waste (for an increase in the city's costs), they still pay the same amount. This means that the city's revenues remain constant, despite increasing solid waste costs (Horton, 2004). Traditional systems have proven to have no financial incentive for reducing the waste stream even when recycling and other services are offered at no cost (Hallas-Burt, 2004).

In 2000, it is estimated that 20% of the U.S. population had access to PAYT programs, and an estimated 1.3 million tons of waste were source reduced by variable rate and PAYT communities (Skutmatz, 2004) and today according to Janice Canterbury the U.S. EPA PAYT project manager, more than 6000 communities employ such a program. The three goals of a PAYT are the "three E's": environment, equality, and economics. This program can help communities pay for solid waste costs, distribute costs more evenly among residents and encourage residents to recycle and reduce waste (Horton, 2004).

The PAYT program is more equitable than a tax based or flat rate system. PAYT offers greater equality to residents and allows them greater control over their garbage bill (Horton, 2004). A single resident should not be required to pay equal fees as a family of four. A variable rate system would allow a single resident to contract a smaller bin at a substantially lower price. This method would motivate households to minimize the amount of trash they produce in order to take advantage of the lower costs. According to Ernesto Velarde, Public Information Specialist for Environmental Services at the City of Tucson, the output of solid waste for minority households is higher due to the number of

informal residents. The social network in minority communities commonly includes informal residents (persons that do not live in the household yet visit or have minors stay with the formal residents on a regular basis). Although these informal residents contribute to increased solid waste by eating with the formal residents, they also contribute monies to that household. Therefore any increase in fees for solid waste services would be shared between the formal and informal residents. The PAYT program would not unfairly stifle larger or lower earning families. Poorer families, in general, produce less trash and therefore are likely to face lower waste collection fees under unit pricing system” (Miranda, Bauer and Aldy, 2004) and “larger families tend to buy in bulk resulting in less packaging”. (Hallas-Burt, 2004)

The majority of costs associated with sanitation programs are direct costs such as containers, truck purchase/maintenance, labor costs, and facilities. The variable in solid waste is the amount of garbage that is thrown away. When residents throw away more garbage, tipping fees increase at an equal ratio. The increase in trash affects gasoline, truck wear/tear and labor costs, although minimally since the area was already serviced. The fee schedule should mirror the variables in solid waste; the base fee should recover set costs, and additional variable costs should be attached to the variability of the fee, i.e. increased bin size or more trash. An ideal fee schedule should raise rates for increased bin sizes by a significant dollar amount, so to recover the additional costs and to promote reduction. For example, in Sacramento, California and Fort Worth, Texas variable rates are set at a \$4 and \$5 respective difference between each bin (96/64/32 gallon). In comparison, southern California communities provide minimum cart volumes so large

that residents do not experience a real incentive to reduce and divert waste (Miranda and Aldy, 2004).

American communities are not going to suddenly reduce the amount of trash they produce and dispose. Local municipalities are paying out of pocket for increased landfilling, vehicles, labor and health costs. Yet, it is politically unpopular to raise sales or property tax. With PAYT user fee waste disposal costs are transparent, and for the first time, what and how much you throw away is costing you, directly. This gives a very strong message to residents, trash is like any utility (water or electricity) you pay for how much you use, or in this case how much you throw. The PAYT program cannot stand-alone; complementary programs such as recycling and green waste collection need to augment the variable rate to ensure the availability of free or low costs alternatives to throwing it in the garbage can.

D. Recycling

Throughout the nation, the traditional solid waste system of collection, transport and land disposal is being replaced with an often-complex assortment of source separation, collection, transfer stations and land disposal (Baetz, 1994). A potential PAYT program needs to implement complementary programs that allow residents to reduce the amount of waste they are throwing away. The combination of convenient recycling access (heavily promoted) with PAYT variable prices generally induces the public to dispose less, compost and recycle more (Canterbury, 2004). A complementary recycling program paired with PAYT variable pricing has reduced the amount of solid waste being landfilled. PAYT communities averaged a 32-59% increase in the amount

recycled (Horton, 2004). While recycling proves to be a necessary complimentary service to PAYT, a PAYT fee structure has also shown to be one of the most important factors in the success of recycling. In a survey of 1000 local recycling coordinators, the respondents identified variable collection rates as the most effective strategy to encourage recycling (Miranda, 2004). Offering a complementary program such as recycling does not often offer a cost savings rather it proves to be a long-term savings to the community and the area by significantly extending the life of the area landfill. Recycling derives other indirect benefits. As Professor Rathje of the University of Arizona Garbage Project so clearly stated, “recycling itself does not save resources. It simply delays the exploitation of new resources”.

E. Green Waste

Green waste is another complementary program that aides in increasing landfill diversion rates. Green waste is defined as grass clippings, leaves, fruit and vegetable peels, and other plant materials. Generally, green waste comprises 20-30% of daily waste. In Tucson according to the University of Arizona Garbage Study, the percentage of green waste is considerably lower at 14% due to a recent push for xeriscaping (usage of low water, native plants) and the low levels of vegetation in commercial areas. Offering green waste collection free of charge will encourage a higher yard waste setouts per household than would a for fee yard waste collection program” (Miranda and Aldy, 2004).

F. Undesirable Outcomes

Cities such as the City of South Tucson that have historically had an illegal

dumping problem, will probably be more likely to experience illegal dumping problems after PAYT is in place (Horton, 2004). To minimize undesirable diversion, communities need to enforce littering and illegal dumping ordinances that fine residents committing violations, while providing informational brochures on desirable and undesirable methods of waste diversion (Miranda and Aldy, 2004). The City of South Tucson has in past years considerably cut down on illegal dumping through similar methods. These methods should be continued if a user fee is implemented.

A significant amount of municipalities are moving to improved finance and programmatic structures that cut costs, increase revenues and reduce the amount of trash landfilled. Enterprise funds and PAYT systems both provide frameworks in which to improve the current sanitation program in the City of South Tucson.

III. City of Tucson Solid Waste Policies

The City of Tucson Environmental Services policies may serve as a framework for the possible restructuring of the City of South Tucson's Sanitation Services. In June 1990, the City of Tucson's Mayor and Council adopted the following long-term waste reduction goals:

- Reduce waste entering landfills by 30 percent by 1995 and 50 percent by 2000.
- Implement citywide curbside recycling by July of 1992.
- Fund solid waste programs by assessing fees based on the amount of waste generated. Taxes currently used to fund solid waste programs should be lowered accordingly.
- Retrofit existing landfills to the best available technology (City of Tucson, 1994).

The City conducted two pilot programs: "Rethink It" Solid Waste Pilot Project in 1994 and One&One Pilot Program in 1996. Both programs tested changes to Tucson's residential collection system with the goal of increasing waste diversion, and improving cost effectiveness (City of Tucson, 1997). "Rethink It" changed existing garbage service from twice a week to once a week, increased recycling collection from once every other week to once a week, added weekly yard waste pick up and improved the brush and bulk collection program. One&One also changed existing garbage service from twice a week to once a week, increased recycling collection from once every other week to once a week, and added weekly yard waste pick up. Both programs shifted the existing service of 300-gallon bins placed in alleyways to individual curbside 90-gallon bin service. Both pilots found that a shift to the modified services would substantially increase waste

reduction, improve cost effectiveness and improve customer service (City of Tucson, 1996).

Lessons learned from the two pilots projects:

1. Once-a-week garbage collection is effective in the City of Tucson.
2. Twice-a-week collection is inefficient “studies found that on the second day of collection 70% of containers are under 40% full” (City of Tucson, 1997).
3. A majority of residents supported implementation of once-a-week recycling/ trash service.
4. Container overflow did not materialize.

Following the pilot studies, in 2003, the City of Tucson implemented a citywide recycling program, *Tucson Recycles*. The program changed the traditional solid waste pickup from twice a week, to a once a week combined solid waste and recycling pick up. The City provides residents with the solid waste and recycling bins. The majority of residents receive a 90-gallon bin curbside service, although 60-gallon bin and 30-gallon bin curbside service is offered to smaller households. Three hundred gallon bin alley service is available in some neighborhoods. A 90-gallon bin curbside recycling service is offered to all single-family households excluding apartment complexes. If a resident with a family of fewer than seven persons requested an extra 90-gallon bin, a monthly fee was charged. Commercial accounts are charged \$14 a month for a 90-gallon bin service and no charge for recycling. With two years of implementation, the City of Tucson has diverted 19-23 percent of its annual solid waste from the landfill while selling the salvaged recyclable materials to a local MRF (Material Recovery Facility). The City of Tucson pays Recycle America \$11 a ton to market the recyclables; and in turn, the City

of Tucson receives 50% of the monthly revenues derived from the sale of the recyclables, for an estimated \$800,000 profit in 2003. These profits are contingent on the regional market demand for recyclables.

On June 21, 2004, the City of Tucson Mayor and Council adopted a new budget transforming the Environmental Services Department into an enterprise operation to be supported by flat rate user fees. Residential fees went into effect on August 1, 2004, and residents receiving refuse service pay a \$14 monthly fee. The bill is attached to the Tucson Water utility bill.

On October 28, 2004, the City of Tucson Mayor and Council and the City of Tucson Environmental Services Advisory Committee (ESAC) in collaboration with the League of Women Voters, Tucson Clean & Beautiful, Southern Arizona Environmental Management Society and the City of Tucson Environmental Services held an informational forum on PAYT solid waste programs. This function marks the City of Tucson's interest in continually improving Environmental Services. In the following Thursday's edition of the local newspaper, *Tucson Weekly*, a few City of Tucson Council people made statements in support of further research for possible PAYT implementation in the City of Tucson.

On December 14, 2004, in the article entitled "Council Merges Water, Trash" published in the *Arizona Daily Star* Mitch Tobin noted that the City of Tucson Council approved the merging of Tucson Water and the Environmental Services Department to increase efficiency. The new department has an operational budget of more than \$100 million and 836 employees.

This reorganization paved the way for the introduction of a new pilot project

discussed in Saturday January 29th, 2005 edition of the *Tucson Citizen*. Writer Oscar Abeyta noted in the article “Pay-as-you-throw to get tested by city”, that the City is planning a pilot program where residents of 3,500 to 4,000 homes would choose from among three bins – about 30, 60 and 90 gallons – and they would be charged different rates, depending on which bin they use. The “pay-as-you-throw program gives people the incentive to recycle more and also more fairly distributes the cost of dealing with municipal waste” (Abeyta, 2005). City Councilwomen Kathleen Dunbar is quoted as saying that “she voted for the new, \$12 monthly garbage fee only on the condition that the City study pay-as-you-throw and that residents need to think of garbage the same way they think of water”. The planning of the pilot project is still in preliminary stages but is expected to begin sometime this year. No price schedule has been discussed but Eliseo Garza, Assistant Director of Environmental Services, stated “we would have a rate schedule that has enough of a difference in tiers to create an incentive for people to go to the smaller size bins”.

The City of Tucson has been working the last 15 years to implement the Mayor and Council’s long-term waste reduction goals set forth in 1990. In the last decade, the City of Tucson has been extremely proactive in modifying their systems through a series of pilot programs that verified the program’s success and reassured the public. In the last year, the City instated an enterprise fund/fee for service and is now planning a pilot project for possible implementation of a PAYT program. The City of South Tucson should capitalize and learn from the proactive efforts of the City of Tucson’s Environmental Services Department.

IV. City of South Tucson Solid Waste Policies

The City of South Tucson (pop. 5,490) is a square mile community that is surrounded by the City of Tucson (pop. 525,944) (City of Tucson, 2004). Small cities with limited resources, such as the City of South Tucson, are especially vulnerable to the economic impacts of the rising costs of waste disposal; therefore, they need to recognize the long-term economic and social benefits of initiating waste reduction programs (City of Tucson, 1994). A lack of external funding for source reduction and recycling implementation commonly puts all expenses on the community, which can be a costly endeavor especially for economically depressed areas.

The City of South Tucson Sanitation Service provides bi-weekly pickup of a 90-gallon or a shared 300-gallon bin at no direct cost to residential properties, although services are indirectly paid for through sales and property taxes. Commercial properties, including rental properties, are directly charged for solid waste services through a monthly bill handled by the Finance Department. Charges are dependent on bin size (90-gallon or 300-gallon) and number of weekly pickups. Commercial charges in the City of South Tucson have not been increased since 1994, consequently current fees are very low. The bulk pickup program, “Dial-a-Bin”, which provides one free haul off container per residential property or paying commercial property annually, started in 2000 as an initiative to clean up properties and prevent illegal dumping. This program has been extremely successful. Additionally, the Director of Public Works would like to implement further program modifications, such as reduced residential service, and additional complementary programs such as recycling, green waste pick up, and clean up programs.

A. Preliminary Cost Benefit Analysis

This is a preliminary cost benefit analysis of the City of South Tucson Sanitation Services. Tracking exact numbers for this program is difficult because expenditures and income have been housed under several departments such as Public Works, Finance, Administration, City Clerk and the general fund. For a small community with limited resources such as the City of South Tucson, total project expenditures/revenues from startup to the long-term need to be clearly evaluated. This analysis attempts to use a quantitative approach that utilizes primary source data; collected from City departmental records, the census bureau, landfill records, and author designed tracking surveys. The figures below should be used as an indicator or an estimate of the true costs and revenues of the existing solid waste program.

Expenditures

The basic costs incurred for solid waste collection in the City of South Tucson include tipping fees (the charge assessed by weight to dump in the landfill), labor costs including benefits (Public Works, Finance, Administration departments), billing materials, bin replacement, vehicle repair and upkeep, fuel costs and long-term future investments. A brief synopsis of each cost is detailed below:

According to the City of Tucson Solid Waste Management records the City of South Tucson dumped 4207 tons of solid waste from 01/01/03 to 12/31/03 paying an average of \$23 a ton for the grand total of (1) \$96,634. In order to carry out daily duties three city departments (Public Works, Accounting and Administration) provide essential support to Sanitation Services. For example, the Public Works Director and two employees work substantially in the collection and management of the solid waste

service. Specifically, the Public Works Director manages employees, conducts regular citywide inspections, enforces illegal dumping regulations, and responds to customer/citizen complaints. These activities demand an estimated 65% of the Public Works Director's time. Additionally, two Public Works employees perform all solid waste collection and basic dump truck maintenance, which requires a minimum of 67 employee hours weekly. An estimated (2) \$95,587 was spent on Public Works employee salaries in 2003.¹ Furthermore, the Finance Department conducts all data entry, billing, and mailings for Sanitation Services. These activities take one employee an estimated 12 hours monthly, at an annual cost of (3) \$1440.² In addition, three Administration employees regularly carry out multiple tasks related to Sanitation Services such as refuse applications, audits, payments entries, public information, messages for Public Works, arrear notices, and issuance of court summons.³ The above-mentioned activities occupy an estimated 20 hours monthly for the annual cost of (4) \$3,504. Total employee wages plus benefits (Public Works, Finance and Administration departments) for 2003 was \$100,963. Billing material costs (stamps, envelopes, statement paper) are incurred on a monthly basis, as businesses and residential rentals using the solid waste services receive monthly statements. An estimated (5) \$1,614 was spent on billing material. Normal wear/tear and vandalism cause an average of 30 300-gallon bins and 31 95-gallon bins to be replaced annually. The Director of Public Works estimated the value of the replacements for 2003 at (6) \$6,719.⁴ According to Finance records solid waste disposal

¹ The Accounts Payable Department provided annual wages including benefits and the Public Works Director provided scheduled work hours and duties.

² Accounts Payable provided annual wages including benefits and estimated work hour calculations.

³ A system has been created to track one month of interactions in order to estimate time spent on these tasks although it is believed that these numbers are substantially low.

⁴ Replacement costs quoted by Rotonics Manufacturing Inc.

Solid Waste Management in the City of South Tucson

vehicle repair/upkeep expenditures were (7) \$20,207 in fiscal year 2002-03 and as of May 26, 2004, \$16,784 was spent on vehicle repair/upkeep. Long-term investments such as vehicle purchases and infrastructure maintenance are not taken into account (8); however, market rate for a comparable new dump truck is over \$100,000. The estimate fuel use was calculated by tracking fuel use and mileage for one month. This estimate was multiplied by the market rate for fuel, which estimates fuel costs for 2003 fiscal year as (9) \$6,033.35. All expenditures are shown in Table 4.1

Table 4.1 Sanitation Services - 2003 Annual Expenditures

	Activity	Total	Without Work Hours
1	Tipping Fees	\$ 96,634.00	\$ 96,634.00
2	Sanitation (work hours)	\$95,587.33	=====
3	Accounting (work hours)	\$1,872.00	=====
4	Administration (work hours)	\$3,503.88	=====
5	Billing Materials	\$1,613.52	\$1,613.52
6	Bin Replacement	\$6,718.50	\$6,718.50
7	Vehicle Repair/Upkeep	\$20,207.65	\$20,207.65
8	Long term Investments	=====	=====
9	Fuel Costs	\$6,959.36	\$6,959.36
	<i>Estimated Annual Costs:</i>	<i>\$233,105</i>	<i>\$132,142</i>

Source: Authors Analysis (2004)

Revenues

Revenues from Sanitation Services are derived from the commercial service fee. In 1995, the City of South Tucson reclassified residential rentals to commercial residential rentals, implemented a fee for refuse service, and increased the fee rates for all commercial solid waste services. Currently, all businesses and commercial residential rentals that utilize the City of South Tucson Sanitation Services are charged a minimal fee for waste removal; these revenues are deposited into the

general fund. In 2003, the City of South Tucson provided Sanitation Services to 249 businesses and residential business rentals generating \$129,888.

Expenditures versus Revenues

Table 4.2 shows that Sanitation Services cost the City of South Tucson’s general fund an estimated \$103,000 in FY 2002-03. It is important to remember that many of these numbers are estimates and do not take into account long-term investments, replacement vehicles and infrastructure, among the many other hidden costs. Additionally, annual increases for labor costs, gasoline, and vehicle replacement have not been taken into account but they can be expected to increase.

Table 4.2 Sanitation Services - 2003 Balance Sheet

	Total	Without Work Hours
Estimated Annual Costs:	\$233,105	\$132,142
Total Revenues:	\$129,888	\$129,888
Difference	-\$103,217	-\$2,254

Source: Authors Analysis (2004)

It is clear that Sanitation Services is essential to the City of South Tucson residents and businesses. Under the FY 2004/05 programmatic and financial structure almost 75% of the program is funded by the general fund. The 2004/05 allotted budget for Sanitation Services is \$414,696, of which only \$ 114,000 of these expenditures (City of South Tucson FY 04/05 Adopted Budget) are expected to be raised through the refuse collection fees (commercial and residential rental). General funds monies are directly subsidizing this \$300,696 difference between expenditures vs. revenues.

Revenue Options

According to the City of South Tucson Finance Director there are four finance mechanisms that the Mayor and Council can utilize to augment general fund revenues;

(1) primary property tax, (2) secondary property tax, (3) sales tax or (4) charge for service.

(1) Primary property tax (\$42,000 annually) accounts for a small percent of the overall revenues, has historically been held very low by City legislatures, and can only increase 2% annually for existing structures. This option cannot increase general revenues or augment the general fund substantially.

(2) The City is not currently utilizing secondary property tax. Although, introducing this increased rate as a secondary sales tax could payoff existing bonds and free up to \$300,000 annually.

(3) City of South Tucson's sales tax is currently .5% more than surrounding areas and restaurant sales tax is 1% more than surrounding areas. Fifty percent or an estimated \$2.3 million of the City revenues are currently raised through sales tax. To increase these percentages would place the city at risk of deterring future business and/or pushing out existing business. This is not a viable option.

(4) Charge for service is a common way for municipalities to increase revenues and/or cover the cost of providing services without risking political repercussions. Further more, "government officials may find that it is more politically feasible to establish or raise user charges than to increase property taxes or cut back on governmental services" (Bunch, 2004). Currently, the City of South Tucson does charge a solid waste fee for commercial and residential rentals. These rates have not been

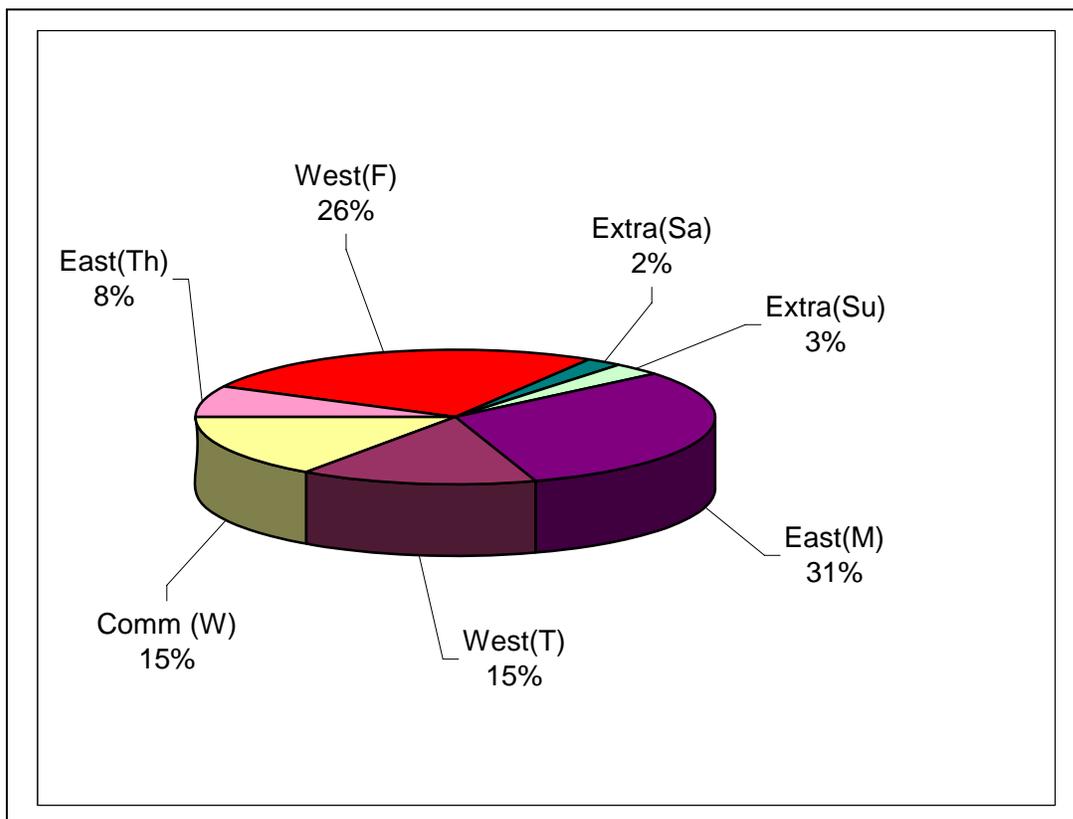
increased for ten years and fall far below the revenue needed to support the current program.

The only financial mechanism that can be used to increase general fund revenues, in order to lessen the burden of the current sanitation program and protect against future financial crisis, is to increase and expand fee service.

B. Current Solid Waste Service Route Capacities and Tonnage

The following figures demonstrate the 2003 program averages for quantity of solid waste dumped and man-hours expended. Figure 4.1 shows the percentage of solid waste disposed of in each service route. The east route (Monday and Thursday) and the

Figure 4.1 Route Disposal Percentages

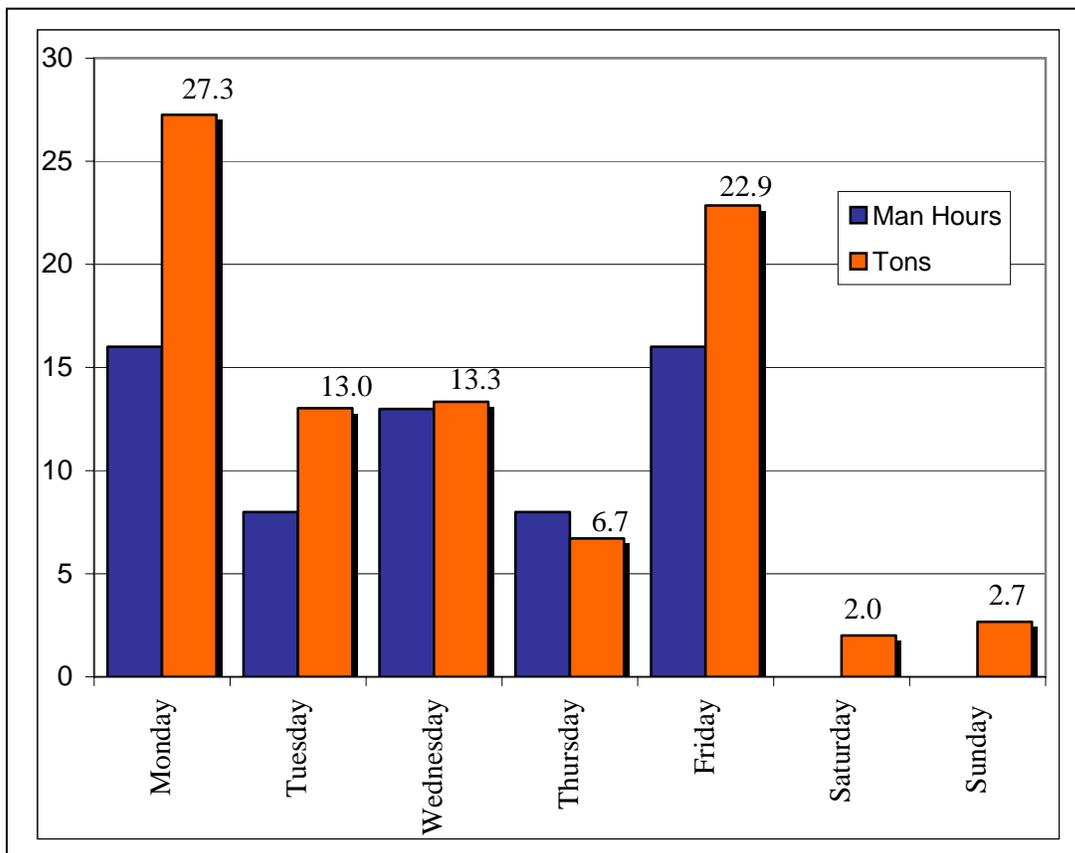


Source: Authors Analysis (2004)

west route (Tuesday and Friday) are a combination of commercial and residential pickups with Wednesday serving as a primarily commercial route. The heaviest disposal days fall before and after the weekend on the commercial/residential Monday and Friday routes. These numbers can be utilized to identify programmatic improvements, which could include moving to once a week residential pick-up and adding complementary services i.e. recycling or green waste service.

Figure 4.2 examines the quantity of solid waste disposed in relation to the number of dedicated man-hours. The heaviest disposal days, Monday and Friday, handle an

Figure 4.2 Route/Work-Hours/Tons



Source: Authors Analysis (2004)

average of 27.3 tons and 22.9 tons respectively in 16 hours ($50.2 \text{ tons}/16 = 3.14 \text{ tons}$

hourly). The Thursday route handles an average of 6.7 tons in 8 hours ($6.7/8 = .84$ tons hourly), and the Wednesday route an average of 13 tons in 13 hours (1 ton hourly). These low average pickup levels allow for programmatic adjustments that could include complementary services.

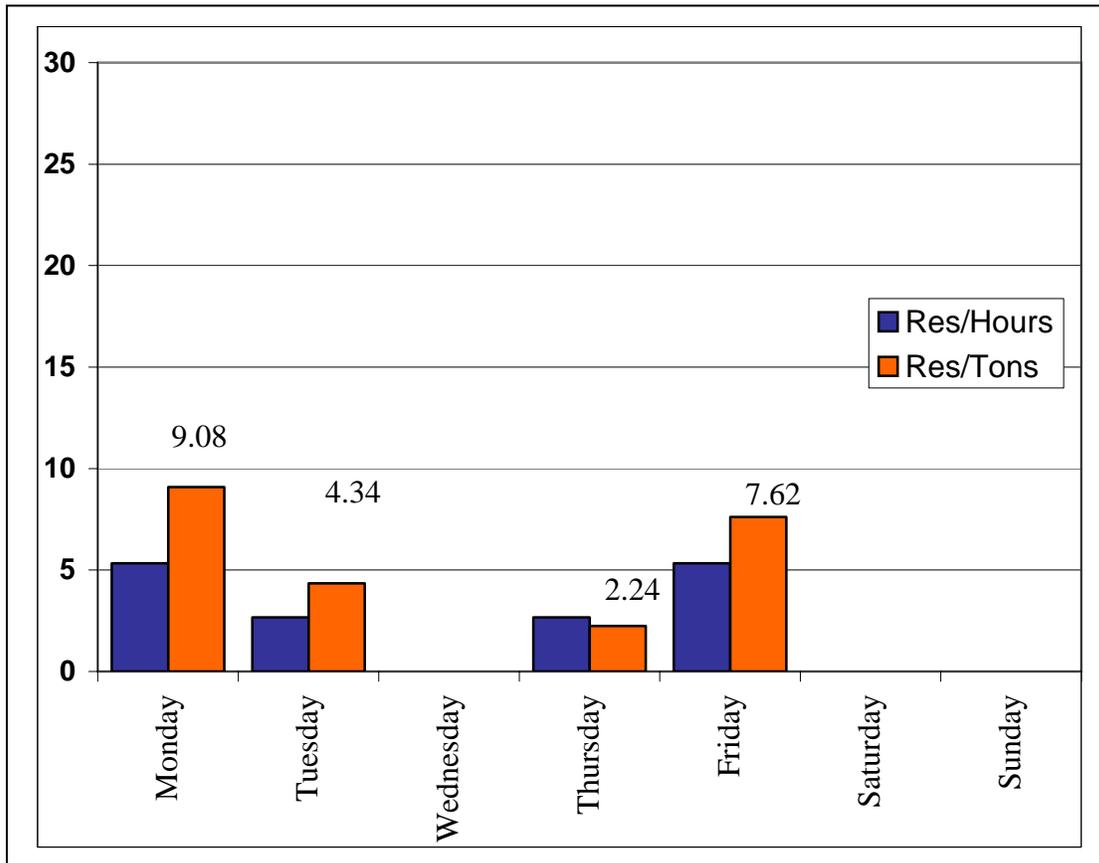
C. Modified Solid Waste Service Route Capacities and Tonnage

To minimize time and energy spent collecting solid waste, countless municipalities such as the City of Tucson have moved to a once a week pick up. The figures below demonstrate how the current program could be modified from a twice a week service to once a week pick up, and the expected effects of that programmatic change.

To estimate the effects of switching residential pick up from twice a week to once a week, it is necessary to estimate the percentage of total solid waste that is generated by commercial accounts verses residential accounts. This percentage was quantified by multiplying the total available bin capacity (300 gallon or 90 gallon) by the number of pickups weekly (1,2,3,4,5 times weekly) and dividing by the total quantity of available space for trash disposal. Note that this estimate assumes that all bins are filled to an average capacity, and that capacity is directly proportional to the weight of the solid waste disposed of. In this model it is assumed that commercial business will request the smallest bin size and lowest number of pick ups needs weekly and that the City will provide the least amount of bins needed for residential use. Using this methodology, in the City of South Tucson commercial, business and residential rentals account for 63% of the total available solid waste bin capacity, leaving the remaining 37% as residential

capacity. Figure 4.3 illustrates the estimated amount of solid waste and work hours for solely residential pick-ups. It is important to recall that the west route is picked up on Monday and Thursday and the east route on Tuesday and Friday. When the bi-weekly

Figure 4.3 Estimated Residential Work Hours/Solid Waste Quantity

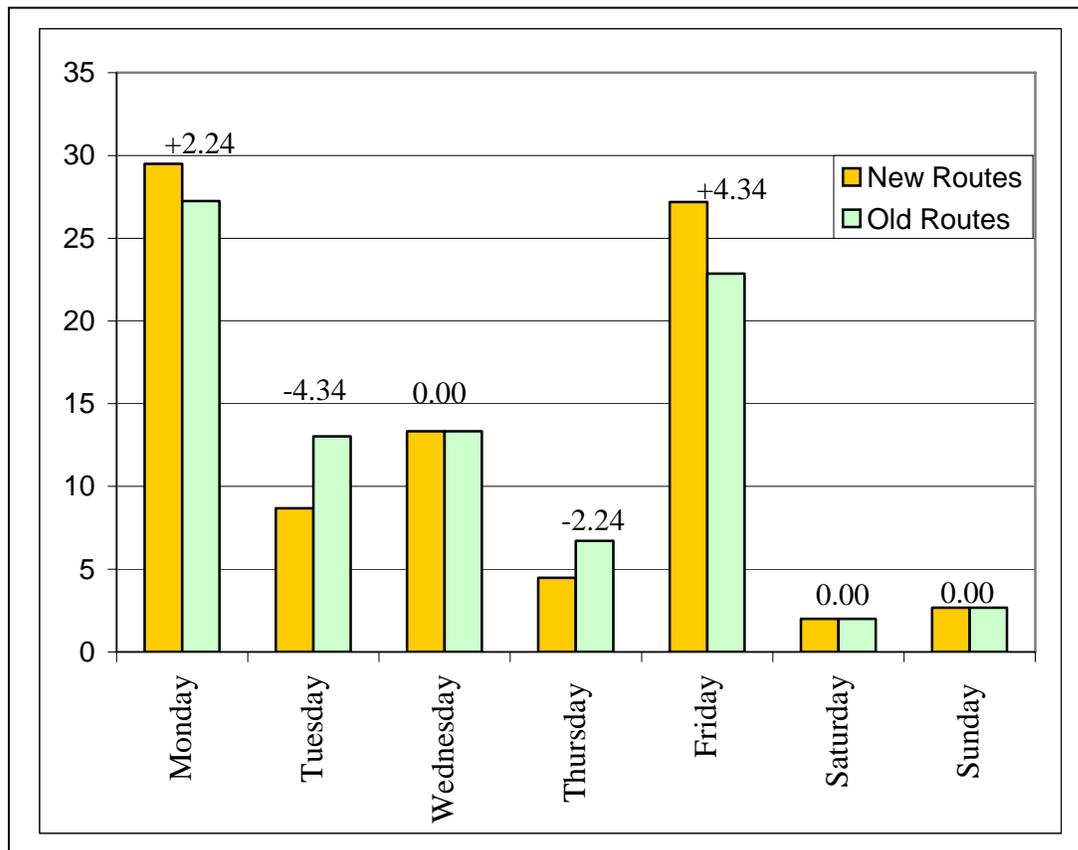


Source: Authors Analysis (2004)

routes are combined into a single weekly route the estimated average residential solid waste would not substantially increase the pick up loads. The combination of the residential routes into a single residential route would lower the tonnage and work hours needed on the alternative days. This would allow time for the implementation of complementary programs such as recycling and green waste pickup. In the following figure, residential routes have been combined with the Monday and Friday routes

showing that the total solid waste collection will at most increase an estimated 4.3 tons on the Friday's west route, which is still below the current Monday east route pickup (see figure 4.4.).

Figure 4.4 Increased quantities single weekly pickup



Source: Authors Analysis (2004)

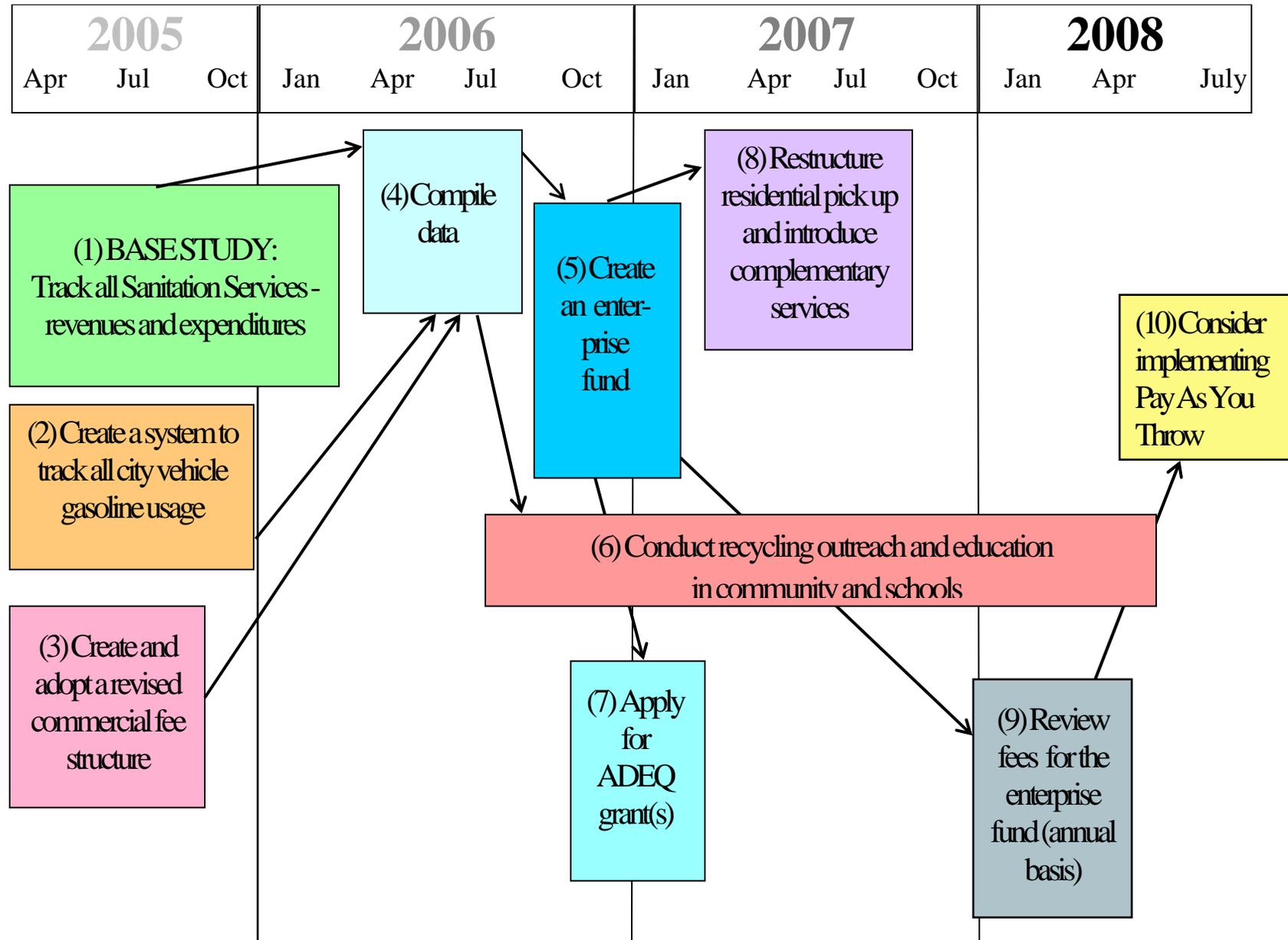
V. Recommendations

Due to recent trends in solid waste management (increasing costs of landfilling, stricter environmental guidelines, and the future possibility of state mandated waste reduction programs i.e. recycling) the City of South Tucson cannot afford to continue subsidizing the solid waste program, rather solid waste should be treated as a utility. The City of South Tucson should implement the following financial and programmatic changes to Sanitation Services in order to account for all expenses, reduce future financial strain on the general fund, prepare for stricter national and state environmental regulations that mandate source reduction and recycling programs (such as California, Minnesota and Oregon) and plan for future programmatic changes i.e. Pay As You Throw, recycling and green waste implementation. The programmatic recommendations build on themselves and should be implemented in the order that they are presented as seen in Figure 4.5 Tentative Program Implementation Timeline.

- (1) The City should set up a finance system that track Sanitation Services expenditures and revenues including hidden cost such as; long term debt (vehicles), infrastructure costs, and, gasoline usage. For the FY 2004/05, Sanitation Services has been allotted over \$300,000 (before hidden costs) above and beyond the revenues gained from commercial solid waste fees. In this economic era of decreasing federal monies, increasing cost of investment and overall economic uncertainty, it is essential that city legislators and staff have access to the true costs of providing sanitation service.

Figure 4.5 Tentative Program Implementation Timeline

Source: Authors Analysis (2004)



- (2) The City of South Tucson should implement a tracking system of gasoline usage so that each department is billed individually for the gas their department uses. This will also promote needed maintenance (i.e. if a vehicle is using an extraordinary amount of gasoline it would signal fleet service to check the vehicle) and will indicate abuses of City vehicles. The Finance Director is currently investigating the tracking of gasoline usage.
- (3) The City of South Tucson commercial/residential rental service fees have not been increased in ten years. The City should create a uniform fee structure and increase commercial and residential rental fees for service. The current fee structure as shown in Table 5.1 increases rates randomly, i.e. commercial 300-gallon twice a week service increases by \$5 for three times a week with a \$17 increase to four times a week. An alternate formula that was created by the City of South Tucson Finance Director,

Table 5.1 City of South Tucson Fee Schedule (monthly)

Regular Collection

Pickups Weekly	90-gallon bin		300-gallon bin (inc. alley service)	
	Commercial Housing	Commercial	Commercial Housing	Commercial
Two (Housing only)	\$12	\$12	\$15/1 unit or \$30/2 units or \$33/3 units or more (per locale)	\$44
Three	\$15 (+\$3)	\$15 (+\$3)	\$44 (+\$11)	\$49 (+\$5)
Four	-----	-----	\$49 (+\$5)	\$66 (+\$17)
Five	-----	-----	\$66 (+\$17)	\$82 (+\$16)
Six	-----	-----	\$82 (+\$16)	\$99 (+\$17)

* City of South Tucson City Code §20 (20-25) Ordinance No. 94-04, 10-31-94

and used to determine a highly successful solid waste service fee for the City of Bisbee should be utilized [(volume of container x # of pickups

- weekly) + set service fee + set billing fee = cost of pickup]. To ensure that fees are both fair and up-to-date, it is necessary for the fee structure to be reviewed in relation to projected income and expenditures on an annual basis.
- (4) By the end of FY 2005/06, the Finance Department should utilize the compiled data to fully analyze revenues and expenses incurred by the Sanitation Services program. When this is accomplished all hidden costs of the program will be accounted for. Based on this information, Mayor and Council should implement changes that are the most beneficial for residents and efficient for the City to implement.
- (5) The City should create an enterprise fund that will treat Sanitation Services as separate financial unit by charging both a residential and commercial service fee based on the cost of providing that service (determined by the Finance Department in FY 2005/06). It is important to hold a series of public meetings announcing the City's intentions to begin an enterprise fund and charge a residential flat fee.
- (6) The City should hire a part-time community outreach/educator who will aid in the creation and implementation of an educational program for the community and area schools. As well as aid the City in utilizing programs developed by ADEQ, EPA and the City of Tucson. Specifically educational material can be found on the EPA website, www.epa.gov/teachers/curric-waste.htm or www.epa.gov/highschool/waste.htm (accessed April 8, 2005).

- (7) The City of South Tucson should apply for ADEQ education and recycling implementation grant funding (Waste Reduction Assistance [WRA], Waste Reduction Initiative Through Education Funding [WRITE]) in February of 2007. The WRA program focuses on waste reduction, recycling, and composting. WRA funds a variety of projects from new recycling programs or electronics recycling, to green waste such as mulching and composting projects. These funds can be used for capital improvements and/or to expand existing programs. WRITE funds educational programs that focus on waste reduction, recycling, and/or composting. These projects often include school programs, technical assistance, and/or workshops. These grants can be accessed on the ADEQ website at www.azdeq.gov/envIRON/waste/solid/funding.html. (accessed April 8, 2005).
- (8) The City should restructure residential solid waste pick up from twice a week to once a week and introduce complementary services such as recycling and green waste pickup.
- (9) The City of South Tucson staff should review the rate system on an annual basis to ensure that rates are at the appropriate level (i.e. not a financial burden yet not making a substantial profit) for the program.
- (10) The City of South Tucson should review the sanitation system and consider the benefits of implementing a Pay As You Throw system that would further promote recycling and solid waste reduction.

VI. Conclusion

Solid waste is a growing concern throughout the United States and the world. Nationwide land prices are skyrocketing, landowners are unwilling to live next to a dump and stricter environmental protection regulations are forcing the municipal landfills farther out of the city and pushing solid waste dumping costs through the roof, which in turn is draining municipal budgets. These fiscal drains and stiffening regulation have forced local legislators nationwide to modify the way in which they treat solid waste disposal. Cities and towns are setting up systems that treat waste as a utility that is paid for incrementally and based on usage. In 2000, 20% of the U.S. population had access to Pay As You Throw programs and an estimated 1.3 million tons of waste were source reduced by variable rate and PAYT communities (Skutmatz, 2004). These communities are preparing for the not so distant future where landfilling will be astronomically expensive, environmental regulations will mandate recycling/source reduction and municipalities will have to charge for services rendered, forcing the consumer to waste less and conserve more.

The City of South Tucson has the opportunity to set up a financial system that would prepare it for the future. The current system does not allow for an easy transition into an enterprise fund or solid waste reduction programs. The programmatic recommendations, if followed, would build on themselves and allow for a slow transition to an improved and efficient solid waste system that will benefit the City of South Tucson residents.

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