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ABSTRACT

FRESH KILLS DUMPED: A POLICY ASSESSMENT FOR THE MANAGEMENT OF NEW YORK CITY’S RESIDENTIAL SOLID WASTE IN THE TWENTY-FIRST CENTURY

by
Aaron William Comrov

New York City ceased disposing of its daily residential solid waste output within its municipal borders in March 2001 when the Department of Sanitation completed its phase-down of the Fresh Kills landfill on Staten Island. The closure of this facility has, for the first time in history, stripped New York City of its waste management self-sufficiency, created a situation in which municipal officials are reliant on private firms and other governmental jurisdictions for disposal services, and contributed to deteriorating fiscal, environmental, political, economic, social and practical conditions.

Consequent and concurrent to this predicament, a multitude of alternative policies have been suggested by different interests, yet after two years New York City still finds itself without a workable garbage disposal policy. This thesis judges these alternative plans based on technical criteria and identifies the best option for moving forward. The conclusion couples this recommendation with an effective waste-reduction scheme and analyzes the combined proposition within the context of New York City’s political climate.
FRESH KILLS DUMPED: A POLICY ASSESSMENT FOR THE MANAGEMENT OF NEW YORK CITY’S RESIDENTIAL SOLID WASTE IN THE TWENTY-FIRST CENTURY

by
Aaron William Comrov

A Thesis
Submitted to the Faculty of
New Jersey Institute of Technology
in Partial Fulfillment of the Requirements for the Degree of Master of Science in Environmental Policy Studies

Department of Humanities and Social Sciences

May 2003
FRESH KILLS DUMPED: A POLICY ASSESSMENT FOR THE MANAGEMENT OF NEW YORK CITY’S RESIDENTIAL SOLID WASTE IN THE TWENTY-FIRST CENTURY

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This project is dedicated to my beautiful wife, Elana. Without her unwavering support, continuous inspiration and loving devotion, this thesis would not have been possible.

This project is also dedicated to my family – our interest in garbage spans generations.
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<td>APWA</td>
<td>American Public Works Association</td>
</tr>
<tr>
<td>BFI</td>
<td>Browning Ferris Industries, Inc.</td>
</tr>
<tr>
<td>CNAD</td>
<td>Center for a New American Dream</td>
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<tr>
<td>DOS</td>
<td>Department of Sanitation (New York City)</td>
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<tr>
<td>DSD</td>
<td>Duales System Deutschland</td>
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<tr>
<td>EBUF</td>
<td>Enclosed Barge Unloading Facility</td>
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<tr>
<td>EI</td>
<td>Empowerment Institute</td>
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<tr>
<td>EPA</td>
<td>Environmental Protection Agency (United States)</td>
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<td>EPR</td>
<td>Extended Producer Responsibility</td>
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<td>ETP</td>
<td>EcoTeam Program</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>IBO</td>
<td>Independent Budget Office (New York City)</td>
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<td>LA</td>
<td>Los Angeles</td>
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<tr>
<td>LABOS</td>
<td>Los Angeles Bureau of Sanitation</td>
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<tr>
<td>LULUs</td>
<td>Locally Undesirable Landuses</td>
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<td>MFTA</td>
<td>Materials for the Arts</td>
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<tr>
<td>MGP</td>
<td>Metal, Glass, Plastic</td>
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<tr>
<td>MRF</td>
<td>Materials Recovery Facilities</td>
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<td>MSW</td>
<td>Municipal Solid Waste</td>
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<td>MTS</td>
<td>Marine Transfer Station</td>
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<tr>
<td>NAFTA</td>
<td>North American Free Trade Agreement</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<tr>
<td>NIMBY</td>
<td>Not in My Backyard</td>
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<td>NJ</td>
<td>New Jersey</td>
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<td>NJDEP</td>
<td>New Jersey Department of Environmental Protection</td>
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<td>NYC</td>
<td>New York City</td>
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<td>NYCHA</td>
<td>New York City Housing Authority</td>
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<td>OWN</td>
<td>Organization of Waterfront Neighborhoods</td>
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<td>PAYT</td>
<td>Pay-As-You-Throw</td>
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<tr>
<td>PCSD</td>
<td>President’s Council on Sustainable Development</td>
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<tr>
<td>RBRC</td>
<td>Rechargeable Battery Recycling Corporation</td>
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<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
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<td>SDLAC</td>
<td>Sanitation Districts of Los Angeles County</td>
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<td>SEC</td>
<td>Sanitation Equipment Charge</td>
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<td>Seattle Public Utilities</td>
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<td>SR</td>
<td>State Route</td>
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<td>SRIISFP</td>
<td>Solid Resources Infrastructure Strategy Facilities Plan</td>
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<td>SWMP</td>
<td>Solid Waste Management Plan</td>
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<tr>
<td>TPD</td>
<td>Tons Per Day</td>
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<td>Tons Per Year</td>
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<td>TTT</td>
<td>Turn the Tide</td>
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<td>WMX</td>
<td>Waste Management, Inc.</td>
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<td>WTC</td>
<td>World Trade Center</td>
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<td>WTE</td>
<td>Waste-to-Energy</td>
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CHAPTER 1

A CONCISE HISTORY OF THE NYC TRASH PROBLEM

"Dealing with the waste stream in the 21st century probably is New York’s most important unsolved environmental problem."

— New York Times Editorial, 5/2/98

"New York at the start of the twenty-first century is no more able--perhaps less able--to plan and implement solutions to such basic municipal functions as waste management than it ever has been…"

—Benjamin Miller in Fat of the Land: Garbage in New York, the Last Two Hundred Years (2000)

1.1 Introduction

The City of New York at the beginning of the twenty-first century finds itself lacking a comprehensive and coherent sanitation policy. The permanent closure of the Fresh Kills landfill on Staten Island in March 2001 has led to conditions in which the most populous city in the United States has been unable to implement an alternative waste disposal plan. The City now relies on a temporary stopgap measure of exporting, mostly via semi-trailer trucks, the approximately 13,000 daily tons of residential trash\(^1\) generated by the five boroughs to outlying states (FKTF, 1996). This interim plan is seen as politically, economically and socially unsustainable.

\(^1\) In modern America, the words “trash,” “garbage,” “waste,” “refuse” and “rubbish” are usually used interchangeably. According to the American Public Works Association (APWA) however, they have different meanings. For example, “garbage” is used to refer to wet or organic matter such as food. “Rubbish” refers to dry materials. “Trash,” “waste” and “refuse” include both of these categories, as well as “construction debris, ashes, and street sweepings.” The APWA uses the term “refuse” to group all solid wastes together, whether it be residential, industrial or sewage wastes (Fee & Corey, 1994). For the purpose of this report, I will use most of these terms to refer to the type of solid waste that is at the heart of this discussion, namely residential municipal solid waste.
The problem that New York City (NYC) now faces in finding a solution to its trash disposal dilemma is unique when compared to the waste management predicaments it has faced in the past. This is so because the decision to close the Fresh Kills landfill has forced NYC, for the first time since it stopped the practice of ocean dumping in 1934, to find a resting place for all of its trash outside its own municipal borders (Friedman, 2001; Martin, 1998; Outerbridge, 2000; Toy, 1996a).²

1.2 Early Disposal Methods

While many other large cities in the United States have relied on the exportation of trash for many years, the Fresh Kills’ closure has precipitated the end of waste management self-sufficiency for NYC (Johnson, 2001b). NYC has utilized a variety of means to dispose of its trash over the years, including ocean dumping, incineration and landfilling (Fee & Corey, 1994).³

1.2.1 Ocean Dumping

A trash disposal method that had been widely used since the establishment of the City is ocean dumping. Initially, the City’s wastes were simply dumped into the Hudson and East Rivers, but this practice was stopped in 1857 after it became a threat to navigation. As a result, a state harbor commission chose the waters around Liberty and Ellis Islands as the official dumping grounds for the City. After the trash dumped at this location kept

² Throughout this thesis, I have made use of an extensive range of sources that have contributed greatly to my research. The sources include, but are not limited to, books, journal articles, newspaper accounts and governmental reports.

³ Purposely excluded from this history of NYC’s trash disposal methods that is described in this chapter is a discussion of the City’s recycling program. This is covered in Chapter 5.
washing ashore in New Jersey and Long Island, the state harbor commission in 1872 relocated the official dumping grounds to Lower New York Bay, off the coast of Staten Island. However, even after this move, trash still washed ashore and polluted oyster and fishing areas (Fee & Corey, 1994).

After a successful experience with reclaiming trash for other uses (referred today as “recycling”) from 1896 until World War I, and a decrease in the amount of ocean dumping, NYC returned to ocean dumping as its primary means of trash disposal. Although the Department of Sanitation hauled its trash barges far out to sea to dump, NYC trash continued to wash up on the Jersey Shore. This led to a Supreme Court battle between the two sides, with New Jersey prevailing in the end. The last trash barge dumped its load at sea on June 28, 1934 (Fee & Corey, 1994; Gandy, 1994; Martin, 1998; Miller, 2000).

1.2.2 Incineration

The first permanent incinerator constructed in the United States was built on Governor’s Island in New York Harbor in 1885, followed by the first municipal refuse-to-energy plant built in 1905. Throughout the next century, incineration was a popular method of ridding the City of its waste stream. This early form of incineration did not utilize many emissions-reduction techniques and the resulting pollution was a source of great public nuisance. By the 1960s, the City was burning approximately a third of its daily-generated

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4 The City's early experience with recycling was successful due to a healthy scrap market for a variety of substances, especially organic wastes that were transformed into fertilizer and nitroglycerine. However, with the advent of synthetic materials after World War II, the market for much of the City's recyclable materials diminished (Fee & Corey, 1994; Miller, 2000)
waste in its 22 municipal incinerators and 17,000 apartment incinerators. However, stricter laws (mostly as a result of environmental concerns) regulating the operation of incinerators made running these plants by the 1980s impractical. As a result, the last municipal incinerator closed in 1990, and the few remaining apartment incinerators shut their doors in 1993 (Gandy, 1994; Martin, 1999b; Miller, 2000; NYC Comptroller, 1999).

1.2.3 Landfilling

The oldest and most important means of trash disposal throughout NYC history has been landfilling. For much of its history, NYC used its trash to increase waterfront property, fill in wetlands and topographical depressions, and lay the foundations for a variety of infrastructure projects, parks and roadways. Much of the physical geography of NYC, especially its shoreline has been shaped by the landfilling of trash. In fact, according to one source, 33 percent of the land south of City Hall in Lower Manhattan was created by landfill filled trash (Fee & Corey, 1994; Miller, 2000; Walsh & LaFleur, 1995). Many NYC landmarks have been created from garbage, including Orchard Beach, Flushing Meadows-Corona Park (site of the 1939-40 and 1964-65 World’s Fairs), LaGuardia Airport and John F. Kennedy International Airport (Caro, 1974; Miller, 2000).

---

5 A 1951 City ordinance actually required all new apartment construction to contain in-house incinerators (Gandy, 1994).
1.3 Later Disposal Methods

Disposal by landfill became increasingly popular after ocean dumping was banned in the 1930s. By the end of the same decade, the City had 89 landfills located throughout the five boroughs. However, as was the case with incinerators, tough new environmental laws forced the closure of most of the City's dumping grounds. By the 1970s, NYC had only six landfills remaining, and by 1991 the only landfill still being used by the NYC Department of Sanitation (DOS) was the infamous Fresh Kills landfill on the southwestern shore of Staten Island (Martin, 1998; Miller, 2000; NYC Comptroller, 1999).

1.3.1 The Rise and Fall of Fresh Kills

Landfilling at Fresh Kills - which had been a quiet and undeveloped tidal marsh and creek until its use as a dumping ground for the City's trash - commenced in 1948 as the result of a deal between Parks Commissioner Robert Moses and Staten Island Borough President Cornelius Hall. Moses got permission to dump at Fresh Kills and in return built for Hall the West Shore Expressway. Even before Fresh Kills opened, word of the plan led to the biggest demonstration ever of Staten Islanders at City Hall. Moses' disingenuous plan had called for the landfill to operate for only three years, after which it would be turned into a park, and during this time an incinerator would be built in each borough to make up for Fresh Kills' planned closure in 1951. In reality, this gave Moses the opportunity to build an approach road to his planned Verrazano-Narrows Bridge between Staten Island and Brooklyn. When the three years had passed, only two of the five incinerators had been constructed, and landfilling continued at Fresh Kills. Finally,
in 1961 - ten years after the original deadline - all five incinerators had been completed, but they were unable to handle the total output of the city’s waste stream. This was due to the fact that six other, smaller municipal incinerators had been taken off-line during this time. With many of the landfills in the rest of the City being shut down, and with the system of municipal incinerators unable to process the amount of waste being generated each day, the landfill at Fresh Kills began to grow in importance as the years passed (Columbia, 2001; Martin & Revkin, 1999b; Miller, 2000).

By 1991, the Fresh Kills landfill was the only disposal option available to the DOS. By 1996, the landfill was accepting the total residential solid waste stream output from NYC, an amount by this point that had risen to approximately 13,000 tons per day (FKTF, 1996; Martin & Revkin, 1999b).

The protests from Staten Island that greeted the creation of the Fresh Kills landfill in 1948 never really receded. As the size of the landfill grew over the years, so did the volume of the protests emanating from NYC’s least populous borough (Toy, 1997). Projected to have between 20 to 50 years worth of capacity left, nevertheless, Mayor Rudolph Giuliani announced in May 1996 that he would close the Fresh Kills landfill by December 31, 2001. This decision has widely been viewed as being politically motivated. All three major political players involved - Staten Island Borough President Guy Molinari, NYC Mayor Giuliani and New York State Governor George Pataki - are Republicans that were largely seen as responding to the decisive Republican electorate on Staten Island, the year before a mayoral and legislative election. In addition, when the closure deal was announced, no alternate plan had yet been devised that would act as a replacement for Fresh Kills (Friedman, 2001; Miller, 2000; Purnick, 2002b; Toy, 1996a).
To guarantee that the deal would not prove to be just another broken politicians’ promise, a bill was passed in the New York Assembly the day following the closure announcement (AP, 1996). Passage of this bill was assured by securing the support of Brooklyn Democrats. The Democrats threw their support behind the legislation when proponents agreed to attach an amendment that banned construction of the Brooklyn Navy Yard incinerator. The incinerator plan had been considered for years by NYC officials and had resulted in fierce opposition from Brooklyn residents (Martin & Revkin, 1999b; Miller, 2000).

1.4 Planning for Post-Fresh Kills

In an effort to find an alternate destination for the City’s trash and to provide an orderly phase down plan for the landfill, a 12-member committee called the Fresh Kills Task Force was assembled in 1996 from city, state and federal officials. The Task Force’s recommendations were released in November and called for increased recycling to lessen the amount of trash shipped to Fresh Kills. Additionally, the Task Force report set limits on how much trash could be accepted by Fresh Kills each year (Clarke, Read and Phillips, 1999; DOS RI, 2002; FTKF, 1996; Toy, 1996b, 1996c). The recommendations of the Task Force also reflected the desire of Staten Island officials to prevent it from once again being the City’s trash solution (as it had been for many years with Fresh Kills). One important stipulation in the Task Force’s recommendation was that, with any future waste management plan, each borough would have to be self-sufficient. This meant that each borough was solely responsible for the collection and disposal of its own trash. No borough could send its refuse to another for processing or exportation. This rule was set
as official DOS practice in the City’s 1996 solid waste management plan (DOS RI, 2002; FKTF, 1996; Martin & Revkin, 1999b; Raflo, 2001).

A tidy shut down of the landfill meant that each passing year up until the closure date would see increased diversion of NYC trash from Fresh Kills. Thus, the Fresh Kills Task Force outlined what would be the de facto disposal policy of the DOS for the next five years. The new policy consisted of awarding short-term contracts to waste haulers who would cart the waste that had been previously shipped to Fresh Kills to out of state landfills. These contracts would remain in place until NYC could devise and implement a long-term and comprehensive policy for disposing its trash.

This interim plan contrasted sharply with what had been the policy and daily routine of the DOS for many previous years. The DOS had utilized its system of eight marine transfer stations (MTSs) located throughout Manhattan, the Bronx, Brooklyn and Queens to ship the City’s daily trash output to Fresh Kills (see Figure 1.4). The MTSs occupy a small amount of waterfront real estate and were considered highly reliable. No processing of trash occurred at the MTSs, only the transfer of garbage from truck to barge. Before the phase down of Fresh Kills started, the MTS system worked in the following way: The DOS’s fleet of 900 white compactor trucks picked up trash from all of the City’s residences. From there, the trucks in the non-Staten Island boroughs hauled their loads to the assigned MTS. Next, the trash was put on huge barges and floated to the Fresh Kills landfill for final burial. Staten Island compactor trucks delivered their loads directly to the landfill (Freidman, 2001; Martin & Barry, 1998; Outerbridge, 2000).
Deviating greatly from this efficient system, the interim plan relies mainly on a truck-based system to dispose of the City’s trash. The DOS had closed the eight MTSs and switched the compactor trucks’ unloading destinations to system of 21 private land-
based transfer stations located throughout NYC and New Jersey. From the land-based private transfer stations, the City’s trash now makes its way to out-of-state landfills via a daily convoy of tractor-trailers (Truini, 2002).  

1.4.1 Outside Opposition

By the time the Task Force was releasing its recommendations that included the exportation of all of NYC’s trash, the states that would presumably be the main importers of NYC trash - Ohio, Pennsylvania and Virginia - had started to balk at the prospects of accepting unwanted Big Apple refuse (Toy, 1996b, 1996c). Nevertheless, in the months of June and July 1997, the first phase of trash exportation began when the first of many short-term trash-hauling contracts was signed and Waste Management, Inc. began shipping trash from the Bronx to a landfill in rural Virginia via railway (Holloway, 1997).

1.4.2 Initial Giuliani Plan

This would not be the only instance of interstate quarreling that would ensue as a result of the City’s desire to rid itself of its trash. In December 1998 - two and a half years after the Fresh Kills closure announcement - the City unveiled its proposed long-term plan for post-Fresh Kills solid waste disposal. Titled “2001 and Beyond: A Proposed Plan for

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6 Private carters have used the system of land-based transfer stations for years as a means to transfer the city’s commercial waste stream for long-distance export. Private companies have handled commercial waste since the 1950s (Raab, 1995; Waldman, 1998).

7 Within a few years, the opposition from prospective trash-importing states to accepting NYC waste reached near pandemonium levels. In February 1999, the top environmental officials from five states— Maryland, New Jersey, Pennsylvania, Virginia and West Virginia—sent a joint letter of protest for NYC’s trash-exporting policies to Mayor Giuliani (Newman, 1999). In the previous month, NYC’s intention to dump more of its trash in Virginia’s landfills sparked a heated exchange of words between Virginia Governor James S. Gilmore 3rd and Mayor Giuliani. After Gilmore threatened to ban trash barges on Virginia’s rivers as a means of curbing NYC trash imports, Giuliani stated that the rest of the country
Replacing the Fresh Kills Landfill,” the plan crafted by the City called for the majority of the City’s trash to be handled by three new large waste transfer stations located in Brooklyn and Carteret and Newark, New Jersey. This plan envisioned using the DOS’s MTSs in the same manner as they had been prior to the phase down of Fresh Kills. However, instead of delivering their barges full of trash to the Staten Island landfill, the loads would be floated to the new large transfer stations that would be built by private contractors. Brooklyn’s trash would be handled by the new transfer station to be built at the Port of Red Hook, and subsequently shipped out from the city via cargo ships or trucks to landfills in Pennsylvania, Virginia and other states. Trash from Manhattan and Queens would be floated to Carteret and Newark, where it too would be transferred to ships or trucks. The New Jersey transfer stations would also send their shipments by railway. In addition to sending the trash to landfills, the plan also envisioned making use of the Essex County Waste-to-Energy (WTE) facility in Newark, New Jersey that had not been operating at maximum capacity. Trash from the Bronx would continue to be exported via rail, while Staten Island would also begin exporting its trash directly via rail to facilities outside of the City. The City had hoped to have the plan running by late 2001 or early 2002 (Clarke, 2001; DOS, 1998; Martin & Barry, 1998).

The prognosis for the success of this plan was poor from the start. The Giuliani administration did not exercise proper political etiquette prior to the public announcement of the trash plan. Hours before the mayor convened a news conference announcing the plan, the office of New Jersey Governor Christine Todd Whitman received a sketchy brief should feel obligated to take NYC’s trash with open arms in return for the financial and cultural benefits it receives from the city (Lambert, 1999).
of NYC’s trash designs. In response, the New Jersey governor released a press statement (concurrent with the Giuliani news conference) that began with the headline, “Whitman to New York’s Garbage Plan: Drop Dead” (Martin & Barry, 1998). From this point on, the first NYC post-Fresh Kills waste management plan never really got off the ground.

1.4.3 Second Giuliani Plan

The mayor himself confirmed the death of this first plan by introducing a revised trash plan in May 2000. This second long-term trash plan called for the use and modification of most of the City’s existing MTS sites, plus the construction of one new MTS in Queens and one at the Fresh Kills landfill to handle Staten Island’s waste. As part of the plan, railheads would be extended in the Bronx and Staten Island, from where trash from the two boroughs would be shipped out-of-state. Thus, half of the City’s trash stream would be exported directly by rail or barge from the existing MTSs. The crux of the new plan would be that a gigantic new transfer station would be built along the Arthur Kill in Linden, New Jersey and operated by Browning Ferris Industries (BFI). The BFI transfer station would accept the other half of the City’s trash from the existing system of barges and transfer it to sealed containers. These containers would then be shipped on trains to

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8 Whitman’s rebuff of NYC’s new trash plan was obviously designed to have the same impact and shock as when former President Gerald Ford refused to aid the City during the financial crisis of the mid-1970s. At that time, the New York Daily News headline summed up the President’s attitude as “Ford to City: Drop Dead” (see Bailey, 1984 and Tabb, 1982 for more details about this and the NYC financial crisis of the 1970s).

9 The Arthur Kill is the river that is located on the western edge of Staten Island and separates the borough from New Jersey (the word “kill” means stream in Dutch). Interestingly, the proposed transfer station in Linden was to be constructed at Tremley Point, which is directly across the river from the Fresh Kills landfill.
landfills in other states (Barnes, 2000; CSWMP, 2000; DOS RI, 2002; Lipton, 2000; Raflo, 2001; Stewart, 2000).

With this second long-term waste management plan, Giuliani appeared to have a hit on his hands. Opposition to the plan was virtually mute, Union County, New Jersey officials gave the plan their blessing, the NYC City Council overwhelmingly approved the plan (which officially was known as the Comprehensive Solid Waste Management Plan Draft Modification), and it finally appeared as if NYC would finally implement the long-term plan that it had been searching years for (CSWMP, 2000; Johnson, 2000, 2001a; NYT, 2000). All that was needed was a permit from the New Jersey Department of Environmental Protection (NJDEP). Everything, it seemed, was falling into place.

However, in January 2001, ethical allegations began to surface about the makeup of the real estate partnership that owned the Linden property where the planned BFI transfer station was to be built. Ethical questions about the property continued to dog the plan for the rest of the year and the remainder of the Giuliani administration (Lipton, 2001a, 2001c, 2001f). An investigation by the State of New Jersey into possible misconduct remained an obstacle to the plan’s adoption. NJDEP refused to grant a

10 The first ethical controversy to plague the Linden-BFI project was when it was revealed that one of the owners of the site was a New Jersey businessman, Benny Villani. Mr. Villani had been tied by the government to organized crime and was banned for life from the New York waste industry. The second controversy was when allegations started to surface about another one of the property’s owners, Domenick Pucillo. Mr. Pucillo is the son-in-law of Linden Mayor John T. Gregario, and ethical questions were raised as to whether or not Mr. Gregario’s political connections helped secure the NYC contract for Mr. Pucillo and his partners. This relationship also raised questions as to whether Mr. Gregario’s participation in the process constituted a conflict of interest. As a result, the New Jersey DEP refused to grant a permit for the project, citing the ethical controversy surrounding it. As a climax to the story, Mr. Gregario was found in violation of ethics rules by a state panel and was fined $2,000. To make matters worse for the second Giuliani trash plan and accompanying Linden-BFI transfer station, then-Mayor of Woodbridge, New Jersey, James E. McGreevey announced his opposition to the plan in January 2001. Mr. McGreevey would then go on to be elected governor of New Jersey in the next gubernatorial election (Lipton, 2001a, 2001b, 2001f; Smothers, 2002).
permit for the BFI-Linden transfer station until the investigation concluded. As time went on, the plan began to be seen as unfeasible and the City eventually dropped it (Johnson, 2002a).

1.5 Recent Developments

In the meantime, despite NYC's continuing troubles in finding a viable trash plan, the phase-down and closure of the Fresh Kills landfill proceeded quite smoothly. After signing a multitude of short-term contracts with waste hauling companies to ensure that all its trash would be disposed of elsewhere, the City shut down the infamous landfill on Staten Island. At the end of 53 years of service and an estimated 108 million tons of refuse piled across nearly 3,000 acres in the former wetland area, the last trash barge dumped its load at Fresh Kills on March 22, 2001 (Johnson, 2001c; Raflo, 2001). The successful closure of Fresh Kills however, meant that finding an alternate plan to deal with the City's mounting trash problem became more pressing.12

11 This signified a success for the Giuliani administration, as the state law requiring Fresh Kills' closure gave the city until December 31, 2001 to close the landfill—over nine months early.

12 The gravity of this statement is illustrated by the situation NYC found itself in June 2001. At this time, NYC was taught just how vulnerable their interim system of relying on interstate trucking could be. A surprise enforcement blitz by Pennsylvania highway officials (named “Operation Clean Sweep” by state officials) had forced many of the NYC-contracted trash rigs off the road and out of service. This created a backlog in the city—forcing trash to pile up at the private transfer stations and outside of commercial establishments for days on end (Lipton, 2001e). A larger and more concerted effort to enforce interstate regulations for trash rigs has been undertaken in New Jersey, Delaware, New York, Pennsylvania, Maryland and the District of Columbia since 1999. This program, which is a collaborative effort between state environmental regulatory agencies and state police agencies, has been dubbed “TrashNet.” This program has ostensibly been responsible for the removal of many other NYC long-haul garbage trucks from the road (NJDEP News Releases, 2002).
1.5.1 Bloomberg Incineration Proposal

By the time the new Bloomberg administration had made itself comfortable at City Hall, it was already apparent that the second Giuliani plan would not be put into motion. The ethical controversy surrounding the plan had put in doubt the feasibility of the idea. In addition, the Bloomberg administration had admitted that it was not happy with the idea of an outside jurisdiction – in this case, New Jersey – having significant control over its trash handling operations (Cooper, 2002b). The time had come for the new leadership to begin exploring new alternatives (Johnson, 2002a). The call for a new trash plan was advocated by the New York Times, which even recommended temporarily re-opening Fresh Kills until a solution could be found to NYC’s garbage woes (NYT, 2002a). The month following the Times’ editorial, in March 2002, Mayor Michael Bloomberg made it known that the City was considering introducing incineration once again into the NYC waste management system, citing improved technological and environmental performance of modern facilities. However, faced with a giant backlash and public outcry, the incineration idea remained just that, and never evolved into a full-fledged long-term management plan. In May, the mayor declared the incineration idea dead and the City continued its search for alternatives to the interim plan (Cardwell, 2002a; Johnson, 2002c).

13 The seriousness with which the Bloomberg administration regarded the trash dilemma is commendable. Bloomberg declared during his first year in office that after focusing on education as a priority during his first 100 days in office, he would devote his second 100 days to finding a solution to the trash issue (Steinhauer, 2002a).

14 Although modern incineration has improved drastically in environmental performance from its ancestors, many residents of NYC are still fearful of the possible public health effects. This opposition may be more emotionally charged than knowledge-based (Thomas Outerbridge, personal communication, February 27, 2003). For an in-depth look at the historical opposition to incineration in NYC, see Miller (2000).
1.5.2 Bloomberg Retrofit Plan

On July 31, 2002, Mayor Bloomberg announced his own long-term solid waste management plan for the City. The basic idea of the plan was very simple, but may be hard to implement. The plan calls for retrofitting all of the City's existing MTSs (and building one additional facility in Staten Island) into compaction and containerization facilities. Instead of just loading trash onto barges - as was done during the Fresh Kills years - the MTS system would be used to compress garbage into 20-foot shipping containers. From the MTSs, these containers would be loaded onto boats, barges or trains. Final disposal sites would ostensibly be located in other states. The City had entertained the idea of using the MTS in the past, but demurred on the idea as being infeasible from an engineering perspective (Cooper, 2002b; DOS, 1998; DOS RI, 2002).

Although he acknowledges that the technical and spatial considerations are obstacles, Bloomberg wants to have the plan implemented within two years. Bloomberg also admitted that the plan would not save the City any money in the short run, but would give the City flexibility and leverage with shippers to attain the best transportation rates and final disposal options. This ability to negotiate a fair price is even more vital now, as DOS's budget had, for the first time, reached over one billion dollars in the previous year, while the City faces its worst fiscal crisis since the 1970s (Cooper, 2002b; IBO, 2001; Lipton, 2002).
CHAPTER 2
SOLID WASTE POLICIES IN AMERICAN CITIES:
THREE CASE STUDIES

Many national (or even international) trends are started in New York City. The fashion industry, and much of the entertainment industry is based in the Big Apple, and the country gets much of its news from the national news agencies, most of whom are headquartered in the City. As a result, partially due to this notion, partially due to its ranking as America's most populous city and partially due to the fact that the United Nations has made the city its home, NYC proudly and unabashedly, if not a bit egotistically, dubs itself the "capital of the world" (NYC website, 2003). New Yorkers may not as readily acknowledge this reputation as being a national trendsetter if the trend is something that is not glamorous or elegant (such as trash disposal). Therefore, it is not as easily ascertainable if the rest of the country is following NYC's lead in regards to municipal solid waste management practices.

2.1 Regional Disposal Trends

New York City's policy since the closure of Fresh Kills has been to export all of its residential trash outside its municipal borders to nearby incinerators and far away landfills. This raises the question, "Is this policy of exportation a harbinger of what is happening or what is to come for other major American cities?" The country does not deal with its trash in a uniform or homogenous manner. Based on the region or state, landfilling, incineration and recycling rates vary dramatically. For example, the Mid-Atlantic and West Coast states lead the nation in recycling, with an overall rate of 39
percent each. The region with the lowest recycling rate is the Rocky Mountain states, which average an 11 percent diversion rate. As far as landfills are concerned, the Rocky Mountain states also have the highest percentage; 88 percent of their municipal solid waste (MSW) is buried in landfills. At the other end of the spectrum, the New England states landfill at a 31 percent rate. The incineration rate for different parts of the country is the opposite of landfilling. New England incinerates 36 percent of its trash, while the Rocky Mountain region burns only 1 percent of its trash. Additionally, many states excel at importing other states' trash, while others lead at export. New York State is by far the largest exporter (thanks in no small part to the closing of Fresh Kills), and sends most of its trash to Pennsylvania and Virginia, the country's number one and two trash importers (Madtes & Goldstein, 2001).¹

Waste management is better understood through a regional, rather than national, view. However, even within regions, the policies dictating the disposal methods of MSW can be quite different. The decision of what to do with the ever-increasing flow of trash is made primarily at the municipal and county level. Each city develops its trash disposal policies according to the unique local and regional conditions it faces. These may include political, social, environmental, economic and geographic considerations. A different way to put this is that in most instances, dealing with trash is a local issue. For example,

¹ Although Pennsylvania and Virginia have claimed the top titles for trash importing states, Virginia may soon fall to the number three spot on the infamous ranking. Michigan is set to overtake Virginia and become the second largest garbage-importing state in the country in 2003. The cause of Michigan's high ranking is its acceptance, since January 1, 2003, of all of Toronto's trash. Since the Canadian city's own final landfill closed (similar to Fresh Kills in NYC), the best immediate alternative for the municipality has been to ship its waste transnationally into the U.S. (as guaranteed by the North American Free Trade Agreement [NAFTA]). However, as a result of a massive political and public backlash in Michigan, Toronto has increased its "good neighbor" diplomacy and has began a search for alternate disposal sites in Canada (Geisman, 2003b; Hakim, 2003; Wolpin, 2003).
Washington, D.C. may decide to incinerate most of its trash since landfill space within the capital city is virtually non-existent and population density is high. On the other hand, Denver may choose to use the sanitary landfill method since open space is relatively abundant in close proximity to the city. Therefore, the trash disposal methods of NYC may not resemble those used in some of America’s largest cities.

2.2 The Solid Waste Policies of Three Cities

Case studies of trash disposal policies of three different cities in the United States will help illustrate the complexity of waste policymaking and put the situation that NYC faces into perspective. The three cities - Los Angeles, Phoenix and Seattle - are in three distinct regions of the country, namely the West Coast, Southwest and Pacific Northwest, respectively. Each city has experienced similar solid waste management issues as NYC and each city has handled these issues differently as a result of the unique conditions present. The case studies of these cities will therefore provide an excellent comparison to the current situation in NYC. As has already been noted, these cities have developed their policies based on the unique and idiosyncratic considerations that are present at each location. Consideration of these responses, together with the similarities that they share with NYC will provide additional insight for NYC. The lessons that each of the following case studies relate are elaborated further upon in Chapter 7.

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2 These local considerations are not static and are always changing, thus affecting the policies of the affected government entity. Thus, national trends are the result of unrelated individual trends that occur at the local level. For example, the number of landfills across the country has steadily declined over the past decade, while the number of incinerators has increased slightly over the past few years (Madtes & Goldstein, 2001).
2.2.1 Los Angeles

The City of Los Angeles (LA), like many other cities in the Sunbelt, experienced phenomenal population growth in the 1940s through the 1960s. During the 1940s, the city went from being the ninth largest city in America to the third largest. Up until the 1960s, the city relied upon a variety of means to dispose of its trash. These methods included different types of incineration, open dumps, a successful source separation (recycling) program and an “active program of swine feeding to handle the organic and food wastes in the waste stream.” The post-war period saw drastic change in how the city disposed of its trash (Blumberg & Gottlieb, 1989).

By the beginning of the 1950s, there were approximately 1.5 million backyard incinerators throughout Los Angeles County. These incinerators were used to burn household trash, and were partially responsible for the area’s deepening smog problem. As a result, Los Angeles County passed regulations in the 1950s to curb the use of these popularly known “Smokey Joes.” While this lead to a reprieve for Los Angeles’ air quality, it increased the stress on the trash disposal system by adding the now non-combusted MSW to the trash stream. The pressure on the sanitary system continued to climb as Los Angeles finally discontinued its swine-feeding practices in 1961.³ This was compounded in the same year by the decision to rid the city of its recycling program and change the collection of trash to a single container pickup system.⁴ As a solution to the

³ The swine feeding program in Los Angeles was the last major one of its kind to be discontinued in the United States. The program ended primarily due to public health regulations addressing hog-manifested diseases and changes in the food industry (Blumberg & Gottlieb, 1989).

⁴ This early recycling program was driven by raw materials shortages during World War II. The program existed as a profitable way to divert much of the City’s trash from the regular disposal system. The recycling program however fell victim to political attacks concerning mismanagement and organized crime
growing trash disposal dilemma, the city turned to the sanitary landfill. In the 1960s, the city opened three new landfills within its municipal borders. These three landfills, in addition to county and privately owned facilities, represented the primary means of trash disposal for the city during this period.

Los Angeles’ reliance on the landfill solution appeared to be coming to a halt by the end of the 1970s. At this time, LA’s Bureau of Sanitation (LABOS) predicted that the city’s remaining landfills would reach capacity by the end of the next decade. The option to site new landfills (or increase capacity at existing ones) was hampered by the stigma attached to landfills in the aftermath of the then-new Superfund legislation, which included many municipal landfills on its initial priority list. In addition, environmentalists opposed the development of the remaining open spaces within the city. As a result, the city turned to the idea of incinerating much of its waste stream in waste-to-energy plants. However, the incineration plans were called off by the end of the 1980s due to organized opposition among city residents (Blumberg & Gottlieb, 1989; Neal & Schubel, 1987; SRISFP, 2000).

During the 1980s, while opposition mounted to siting any incineration facilities in the city, the LABOS began rolling out pilot recycling programs in different parts of the city. By 1989, the entire city was being served by the recycling program. Since 1990, LA has shifted the management of its waste toward a resource separation strategy, as opposed to just simple disposal. In fact, LABOS changed the name of the materials it collects connections. With the election of a new mayor in 1961, the program was discontinued and the shift to a single-can collection system was instituted in the name of greater efficiency (Blumberg & Gottlieb, 1989).

This was known as the Los Angeles City Energy Recovery Project (LANCER), and was to consist of three large incinerators that could handle up to 70 percent of the City’s waste (Blumberg & Gottlieb, 1989).
from solid waste to *solid resources*, thus reflecting its focus on managing resources, rather than waste. As a result of the city’s emphasis on its recycling program, it reached a diversion rate of 49 percent in 1999. The city has set a diversion goal of 70 percent by 2020. This dedication to recycling has actually led to a decrease in the tonnage of waste collected by LABOS during the 1990s, even though the population of the city had grown and waste generated per person had increased during the same period (SRISFP, 2000).

As part of its long term strategy, LA no longer owns any of its supporting infrastructure for the disposal of its MSW. This includes transfer stations, material recovery facilities (MRF) and landfills. According to its solid waste management plan, the Solid Resources Infrastructure Strategy Facilities Plan of November 2000 (SRISFP), LABOS currently disposes of its remaining trash (after diversion) in two private landfills and one landfill owned by Los Angeles County.\(^6\) It also states that the “city’s involvement in its landfills is now focused on closure, maintenance, and ultimate restoration of the six inactive city owned landfills.” Although the city does not own any of the landfills that its non-recyclable waste is hauled to, the SRISFP emphasizes that it is crucial that the city obtain control of much of the waste disposal infrastructure as possible, besides landfills. For example, the SRISFP suggests that the city should regain

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\(^6\) The two private landfills that the City now uses to dispose of its daily trash output are called the Bradley landfill and the Sunshine Canyon landfill. The Bradley landfill is located in neighboring Sun Valley, is owned by Waste Management, Inc., and absorbs most of the City’s daily commercial trash flow. The Sunshine Canyon landfill straddles neighborhoods of the San Fernando Valley and is operated by Browning Ferris Industries. The operation of the Sunshine Canyon facility has caused problems for the City of Los Angeles. The continued use and a proposed expansion of this facility that would bring it closer to residential neighborhoods has caused an uproar in the surrounding communities, and has even partially lead to the secession movement of the San Fernando Valley from the rest of the City. Possibly as a result of this, Mayor James Hahn has opposed the expansion of the landfill and a mayoral advisory committee has recommended closing the site by 2006. The mayor has since pledged to close both landfills (Bernstein, 2002; Fausset, 2002; SWD, 1999; Thermos, 2002).
control of its MRF and composting facilities in order to reduce costs and not be vulnerable to price hikes by its contractors (LABOS, 2002; SRISFP, 2000).\(^7\)

As an indication of the city's shift away from relying on private contractors to dispose of its waste, the SRISFP recommends signing a Joint Powers Agreement with the Los Angeles County Sanitation Districts for the development of a transfer station that will allow for long-haul transport.\(^8\) The waste from this transfer station would then be shipped to one of the County's newly developed desert landfills. This "desert-rail" disposal option would become the long-term disposal method for both the city and the county, and should be operating by 2013 (Cart, 2002; Raflo, 2000; SRISFP, 2000).\(^9\)

2.2.2 Phoenix

The City of Phoenix has also seen its population grow dramatically since World War II. As of the 2000 Census, it is now the sixth largest city in the country, and its geographic footprint covers an area larger than Los Angeles (Phoenix WS, 2002a). As with LA,

\(^7\) The recommendations to retake control of the LABOS infrastructure are a response to the recent consolidation of the waste industry in the United States. The need to minimize the cost of MSW disposal is especially important in Los Angeles, as LABOS relies upon what is called the Sanitation Equipment Charge (SEC) for its funding. The SEC was created in 1983, and removed sanitation costs from the general City budget. The SEC rate as of November 2000 was $6 per single-family residence and $4 per multi-family unit per month (SRISFP, 2000).

\(^8\) The Sanitation Districts of Los Angeles County (SDLAC) are a confederation of 78 cities and unincorporated areas within the county. It provides wastewater and solid waste management services to its constituent government entities, but does not represent the sole method of managing the County's wastewater and trash. For example, the City of Los Angeles Bureau of Sanitation operates separately, but in conjunction with SDLAC. The City pays for some of its trash flow to be buried at a SDLAC landfill (LACSD, 2002).

\(^9\) The Sanitation Districts of Los Angeles County has purchased large landfills within Imperial and Riverside counties that will provide about 100 years' worth of disposal capacity for the County, including the City of Los Angeles (Raflo, 2000).
rapid population growth has also meant challenges for Phoenix’s solid waste disposal operations.\textsuperscript{10}

For years, Phoenix’s Department of Public Works has relied upon landfills that are located within the city’s municipal borders as a place to dispose of its trash. Over the past few decades, the Public Works Department dumped trash at two sites - the 27\textsuperscript{th} Avenue landfill and the Skunk Creek landfill. In the mid 1990s, the 27\textsuperscript{th} Avenue facility closed, leaving only one landfill left to absorb the city’s trash stream (Phoenix WS, 2002b). After considering the option of incineration, Phoenix decided instead to institute a citywide recycling program to extend the life of the Skunk Creek landfill. The recycling program, called Phoenix Recycles was started in 1992 after a few years’ worth of pilot programs. Today, Phoenix Recycles serves all single-family residences and is responsible for diverting approximately 19 percent of the city’s solid waste away from its sole remaining disposal option (Phoenix WS, 2002a, 2002b).

Although the Phoenix Recycles program has been a mild success, the Skunk Creek landfill has begun to near its capacity, and its expected closure date is in 2005. In an effort to find a replacement for the landfill and to provide a viable disposal option for the Public Works Department, the city launched a three-year search for a new facility. Since no significant amount of undeveloped land is available within the city, and any that would be available would be prohibitively costly, the city set its sights on locations within its own Maricopa County as well as parts of neighboring Pinal and Yavapai counties.

\footnote{To help meet this challenge of increasing population and generated waste, the City charges residential units who utilize the trash pickup system a monthly fee similar to Los Angeles’ SEC. The monthly charge is called the Solid Waste Fee and is currently $20.70 for single-family residences (Phoenix WS, 2002d).}
Starting from a dozen potential sites in the area, the city narrowed its choices down to three finalists (LSS, 2001; Sauerzopf, 2002a).

In January 2002, after a lengthy and comprehensive public involvement process, the Phoenix City Council approved the Public Works Department's recommendation to accept a final location. This location is southwest of the city and is known as the State Route (SR) 85 Landfill. The City of Phoenix purchased the private property in unincorporated Maricopa County and immediately began its various assessments, surveys and investigations on the land to ready it for permitting. The SR 85 Landfill consists of 2,652 acres and is slated to begin operations in 2005. As an important element to the process of initializing long distance disposal, the City is also developing a transfer station/recycling facility within the city to transfer materials from the Public Works Department garbage trucks to long haul semi-trailer trucks. This facility is slated to open at the same time as the SR 85 Landfill, in 2005 (LSS, 2002 & Phoenix WS, 2002c).

The SR 85 Landfill is being designed to accept the city's projected trash output for at least the next 50 years. Since the footprint of the landfill is so large and its capacity is so great, the city apparently made various efforts to get the public involved in the planning process. These methods included publishing newsletters, holding community open houses, placing advertisements in the local newspapers, posting flyers in community areas and establishing a project website and telephone information line. Although the area in which the SR 85 Landfill is being sited is relatively sparsely populated, community opposition arose during the final planning steps. However, the pressure on

11 The SR 85 Landfill site is located on private land that is located south of the Town of Buckeye. When Phoenix purchased the land in January 2002, Buckeye responded in August of the same year by annexing
the City was not strong enough to stop the project, and at the present time, Phoenix is on track to have its new remote landfill open on schedule (Sauerzopf, 2002a, 2002b, 2002c; SFS, 2002).

2.2.3 Seattle

The change in the solid waste practices of the City of Seattle is probably the most encouraging and dramatic turnaround story of any major city in America. The city historically disposed of its wastes in two landfills located within the municipal boundaries, the Midway and Kent Highlands landfills. After reaching capacity in 1983, the Midway landfill closed, followed by the Kent Highlands facility in 1986. These dumps had been designated as Superfund sites and the cost to remediate them was covered by a 60 percent increase in the city’s refuse collection rates in 1986. The closure of the city’s last two remaining landfills meant that Seattle Public Utilities (SPU) had to rely on the King County landfill, which resulted in another 82 percent price hike for Seattle’s citizens (Denison & Ruston, 1990; Neal & Schubel, 1987; SCSWMP, 1998).

In an effort to deal with Seattle’s genuine solid waste crisis, the City examined incineration as an option, but city residents’ concerns removed that option. As a result,

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12 The Seattle Public Utilities, the city agency that is responsible for solid waste planning and management was created in 1997 from the City’s former Solid Waste Utility, as well as other city agencies responsible for water, drainage and wastewater services (SCSWMP, 1998).

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SPU began to consider a comprehensive recycling program to minimize the amount of trash (Denison & Ruston, 1990; SCSWMP, 1998). The outcome of this effort was the breakthrough 1989 Comprehensive Solid Waste Management Plan, *On the Road to Recovery.* This plan led the city to a new era in recycling, and called for “curbside recycling and yard waste collection for all residents.” Included in this plan was a mandate that 60 percent of the city’s wastes would be recycled by 1998, with the remaining wastes landfilled in an arid climate. An integral part of the new plan was the implementation of a trash rate structure to encourage recycling and an citizen recycling education program (SCSWMP, 1998).

The plan has been called a massive success. Seattle went from recycling 28 percent of its wastes in 1988 to 44 percent in 1995. When the new Comprehensive Solid Waste Management Plan, *On the Path to Sustainability* was put out in 1998, it proudly declared that Seattle was “…no longer in crisis. The present system works” (SCSWMP, 1998, p. 1.2). By encouraging people to recycle through incentives and finding an economical way to dispose of the material that is not ultimately recycled, Seattle had formed a tactic to solve its trash problem.

The incentive to recycle was provided by restructuring SPU’s solid waste fee rates. The city began introducing different size trash containers, along with new recycling containers. SPU gives residents the choice of five different size containers with a

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13 In Washington State, the majority of solid waste plans are prepared by counties. Because of its size, Seattle chose to create its own plan. However, Seattle’s plan is still officially considered a part of the King County Solid Waste Management Plan, and must not contradict that plan in any way (FKCCSWMP, 2001; SCSWMP, 1998).

14 Seattle’s recycling rate has slightly slipped since 1998. The City’s current recycling rate is 39 percent, still one of the highest in the country (Welch, 2002).
variable rate charge. The smaller the trashcan, the smaller the monthly charges are for trash collection. The opposite is true for larger trash receptacles. The rates charged to households cover the expense of trash disposal and recycling. However, recycling costs are included in the trash collection rates, so it appears to consumers that there is a cost savings from recycling more.\textsuperscript{15} As a result of this price structure change, the average trash container size in Seattle has decreased since 1988. In addition, the average single-family resident's bill is lower than in 1988 (SCSWMP, 1998).\textsuperscript{16}

Another way Seattle has stabilized its trash problem and kept costs low is by finding a long-term facility to receive the MSW that is non-recyclable. Seattle has achieved this by signing a long-term contract in 1991 with Washington Waste Systems, a division of Waste Management, Inc. (WMX). The contract expires in 2028 and consists of hauling Seattle's wastes out of the state five days a week.\textsuperscript{17} The city's MSW is shipped in 40-foot shipping containers and is transported to the Columbia Ridge Landfill and Recycling Center in Arlington, Oregon. The landfill is a 2,000-acre site in the eastern part of the state, in an area of little precipitation. In the event of railway unavailability or breakdown, the contract provides for the backup transport of trash to the landfill by truck. Since the long haul "trash train" has been operating, it has proved to be a reliable system;

\textsuperscript{15} For example, one may recycle as much as possible, without being charged more by the SPU. This however, is not true of trash disposal. The more one throws away (the larger the container), the higher the monthly charges are (SCSWMP, 1998).

\textsuperscript{16} The recycling rates have not improved as dramatically for multi-family residences in the City. (In 1995, the recycling rate for single-family residents was 60 percent, while the multi-family rate was only 18 percent.) This is primarily due to less generated yard waste, landlord non-participation and general lack of facilities to recycle in apartments (SCSWMP, 1998).

\textsuperscript{17} This includes much of Seattle's commercial waste stream, as commercial haulers are allowed to load their trash on the train for a fee.
there have been no significant problems with disposing of Seattle’s waste (Seattle WS, 2001; WBR WS, 2002).

Although the progress made by the City of Seattle since 1989 has been excellent, the new plan in 1998 has set higher and more innovative goals for the city. For example, the 1989 goal of achieving a citywide recycling rate of 60 percent was not achieved by 1998. Therefore, the city has set a new goal of 60 percent by 2008, and has established separate recycling rates for each trash-producing sector.\textsuperscript{18} The new goals are to be attained by new programs including: expanded recycling pickups accepting more types of materials, greater incentives to landlords to encourage recycling, requiring space for recycling in all new multi-family structures built, implementing new education campaigns, providing recycling containers in public places and building a new recycling center.

A quite remarkable and truly progressive step forward in waste management is spelled out by the 1998 plan which called for increased source reduction, especially market development, product stewardship and sustainable building programs. To achieve this remarkable goal, the plan calls for the expansion of buy-recycled programs to consumers, the creation of development incentives for local recyclables manufacturing, the support of the development of new organic materials processing facilities, providing assistance and recycled performance testing, promotion of product stewardship to consumers and producers, providing “education and technical assistance on packaging reduction,” encouraging increased voluntary take-back of certain types of wastes and
supporting state legislation for product stewardship. While some of these initiatives are within reach, the plan recognizes that, due to the scope of the initiatives, many may only be able to be carried out on a regional or national basis. To achieve this goal, the city plans to support federal efforts in this endeavor (SCSWMP, 1998).

2.3 Comparison to NYC

The refuse disposal policies of the three cities reviewed are all unique and are a reflection of the challenges they faced and the solutions they found. Despite their differences, all three cities’ solid waste disposal policies have one significant aspect in common. Los Angeles, Phoenix and Seattle have all faced the prospect of diminishing in-city landfill capacity, and withstanding their differences, have all responded in a similar way. All three cities are now actively engaged in either transporting their daily trash flow outside their municipal borders or devising plans that will allow them to do so in the coming years. For some cities, this policy came relatively early, while others are only beginning exportation. In the same way, some cities ship their trash to locations in relative proximity, while others haul their waste hundreds of miles away.

Los Angeles’ and Seattle’s municipal landfills closed in the 1980s, and the cities began to search for other facilities. Both embarked on vigorous and effective recycling campaigns to reduce the amount of waste flowing to their new landfills. Los Angeles currently utilizes the county’s landfill space, as well as the remaining capacity at private

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18 The breakdown of recycling goals by sector is: 70 percent for single family residential, 37 percent for multi-family residential, 63 percent for businesses and 39 percent for self-haul customers (SCSWMP, 1998).
area landfills, while Seattle has found a resting place for its trash via a contractor, a train ride and a state away.

Phoenix is currently still using its last remaining municipal landfill, but will cease to do so in 2005. While Phoenix established its recycling program about the same time as the other two cities, it has not achieved the same diversion success. The new landfill is located in relative close proximity and will be owned and operated by the city.

The case study cities discussed in this chapter provide an apt comparison to NYC. The individual lessons of these cities will be discussed in greater detail throughout the remainder of this thesis. One important aspect of the solid waste policies of these three cities is that they have - with different levels of success - implemented a management system that includes initiatives to enhance reduction and recycling, as well as disposal efforts. Seattle has arguably been the most successful with this type of portfolio approach. It has been successful at simultaneously reducing waste, increasing recycling and finding an out-of-state site for final disposal. NYC has not been nearly as aggressive in pursuing a similar tripartite strategy. Conversely, with its interim long-haul disposal method, it appears that NYC has addressed only part of what is really needed for the City: an integrated solid waste management scheme.

Finally, it appears that NYC does not seem to be the trendsetter in solid waste management when compared to these three other cities. New York City has only recently closed its last remaining municipally-owned trash dump, and like the other cities discussed in this chapter, is shipping its waste near and far. New York City has not yet proven that it can find a viable plan to handle the ultimate disposal of its own residential solid waste. Therefore, a review of all the alternatives available to NYC's current
predicament may help provide a way out of its dilemma and make its solid waste policies a bit more coherent, a bit more simple, and a bit more workable, just like the City’s three western counterparts.
CHAPTER 3

ASSESSING ALTERNATIVE PLANS FOR THE
MANAGEMENT OF NYC’S SOLID WASTE

3.1 Solid Waste Legislative Framework in NYC

The New York State Solid Waste Management Act of 1988 regulates the management of solid waste throughout the State. This law requires that all government planning jurisdictions within the State prepare an integrated solid waste management plan that covers a 10-year planning window. Pursuant to the 1988 law, the State’s planning entities were obligated to develop plans that meet a goal of 50 percent reduction, composting and recycling, as well as 50 percent waste-to-energy conversion by 1997. As a result, the New York City Department of Sanitation devised the 1992 Solid Waste Management Plan (SWMP) to guide its waste management practices into the next decade (Clarke et al., 1999; Gandy, 1994).

With the 1996 announcement to close the Fresh Kills landfill less than four years after the adoption of the 1992 SWMP, the direction of trash disposal planning in the Big Apple changed course drastically. Under the State’s 1988 solid waste law, NYC was required to amend its 1992 SWMP\(^1\) since a disposal facility that was absorbing at least 85 percent of its residential trash flow was preparing to close (Clarke, 2001; Clarke, et al., 1999).

\(^1\) The requirement to devise a “modification” to the 1992 SWMP in reality meant that a wholly new solid waste management plan needed to be developed.
3.2 Devising New Disposal Schemes

In order to find an alternative disposal option for NYC's waste and to recommend a systematic method for closing the Fresh Kills landfill, Mayor Giuliani and Governor Pataki appointed a 12-member panel shortly after the Fresh Kills closure announcement was made. The Fresh Kills Task Force, composed of City, State and Federal officials, released its report at the end of that year. The Task Force's report primarily focused on phasing out the Fresh Kills landfill over a five-year period and recommended exporting all of the City's trash that was not recycled to facilities outside of the City (Clarke, 2001; Clarke et al, 1999; Toy, 1996a, 1996b, 1996c).

The Giuliani administration embraced the aspects of the Task Force report that addressed the phase-down of the City's last remaining landfill. The City initiated this recommended interim solution for the closure of Fresh Kills by contracting with Waste Management of New York to ship trash from the Bronx via rail to a landfill in Virginia starting July 7, 1997 (Holloway, 1997; Merrill, 1998). The interim plan derived from the Task Force report allowed NYC's residential waste to be diverted in phases from the Fresh Kills landfill to private contractors, who would then haul it to facilities outside NYC's municipal borders. The interim plan also afforded the City time to devise a modification to the 1992 SWMP, and therefore to adhere to the 1988 Solid Waste Management Act.

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2 The Fresh Kills Task Force, while emphasizing a phase-down of Fresh Kills and subsequent export of the city's non-recycled trash, did urge the City to expand its recycling and source reduction programs. In general though, the report did not recommend a specific recycling rate or provide elements of a detailed integrated plan. As a result, the report was ultimately not viewed as a model for a new city comprehensive solid waste management plan (AMPO, 1996; Clarke, 2001; Toy, 1996c).
3.2.1 The Emergence of Alternative Plans

As was discussed in Chapter 1, the City has proposed an assortment of plans since the start of the interim plan. However, due to a variety of reasons, all but the latest plan has not been implemented. Within the same time frame, and in addition to the City’s own proposed trash plans, a host of interested parties developed alternative waste management schemes. The authors of these alternative plans were looking to provide the City with ideas or comprehensive plans that would encourage effective management of the residential trash flow in the wake of the Fresh Kills closure. The entities responsible for these alternative plans discussed in this chapter include the press, government agencies, an educational institution and a non-governmental organization (NGO).

A review of these alternative plans will help to provide an understanding of the salient thinking toward management of the City’s wastes that transpired since the Fresh Kills closure announcement. It will also provide a side-by-side comparison of each plan’s merits and demerits, which will help determine which plan offers the best long-term management scheme for disposing of NYC’s solid waste. In the year 2000 alone, the DOS handled 18,547 tons per day (TPD) of solid waste. The urgency for NYC to find and implement an effective disposal plan is clear (CCWMS, 2002).4

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3 The alternative plans presented here are included because of the significance or ingenuity of their proposals, as well as the credibility of the entities that are responsible for them. This study only includes those plans that were readily available.

4 This number is 11,795 TPD when recycled items and fill material are excluded from the waste stream (CCWMS, 2002).
3.3 Categories of Alternative Plans

Included in the following eleven alternative proposals for dealing with the disposal of NYC’s trash are at least four proposals that are not predicated upon formal reports or supporting publications. The remaining plans were presented in reports that are mostly comprehensive in character and attempt to provide a ready and working policy framework for the City to adopt. The eleven plans are divided into four categories: (a) NYC mayoral administration plans, (b) NYC government agency, NGO and university plans, (c) unofficial plans, and (d) a “no action plan.” A brief history and outline of all the plans is presented next.

3.3.1 New York City Mayoral Administration Plans

As mentioned above, the decision to close the Fresh Kills landfill was made in 1996, while the actual closure did not take place until five years later, in 2001. The five years that was given to close the landfill appeared to be enough time for the City to develop a new solid waste management plan. As the entity responsible for governing the City and for implementing its policies, the NYC administration of Mayor Rudolph Giuliani looked at many ideas, and by the end of its tenure had formulated two new trash plans. Neither of these plans, which were considered in 1998 and 2000, were used. In 2002, the succeeding administration of Mayor Michael Bloomberg devised two new ideas for disposing of NYC’s garbage. The first of the Bloomberg plans resembled more of an

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5 Although these plans may lack a formal report as compared with the other alternatives, an attempt is made to give them equal stature in this comparison.
“idea” than a full-fledged plan, while the second plan is the only initiative discussed in this paper that has even started to be implemented.

3.3.1.1 The 1998 Giuliani Plan. This plan represented the first real attempt by Giuliani to put forward a new solid waste management plan for the City of New York to replace the practice of dumping at Fresh Kills. The plan was announced in December 1998 - two and a half years after the Fresh Kills closure announcement. The amount of time it took to develop this plan indicates the difficulty in changing the trash management practices of the country’s largest city. The plan’s report was named “2001 and Beyond: A Proposed Plan for Replacing the Fresh Kills Landfill,” and it made clear that the long term solution for managing NYC’s waste rested on exportation. Under the plan, the City envisioned utilizing the existing MTS infrastructure, as well as building three new large transfer stations. One transfer station would be built at the Port of Red Hook in Brooklyn, while the other two transfer stations were to be built in Carteret and Newark, New Jersey. The facilities would be built by the City and operated by private companies. The three new transfer stations, more formally known as enclosed barge unloading facilities (EBUFs), would handle waste barged from the MTSs in Brooklyn, Manhattan and Queens. From the transfer stations, the trash would then be shipped to out-of-state landfills via barge, rail or truck. A portion of the waste would also be burned at an incinerator in Newark. Trash generated in the Bronx and Staten Island would be shipped

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6 The most likely rationale for wanting to build two of these large transfer stations in New Jersey (as opposed to all of them in NYC) is both political and practical. By placing the transfer stations in NJ, NYC would short-circuit any potential community opposition that may have arisen to their construction in the City. On a more practical level, the locations in NJ provide transportation links to many points in the country, something that is not easily available on the island boroughs of NYC.
directly out of the City via rail (Clarke, 2001; DOS, 1998; Martin & Barry, 1998; OWN/CPI, 2000).

The 1998 Giuliani plan to find a permanent replacement for Fresh Kills not only made clear that NYC was, for the first time since the 1930s, ready to rely on out-of-city disposal facilities for all its trash, but solidified the notion that the City was no longer willing to even attempt to be self-sufficient in managing its residential solid waste. This inability to be self-sufficient meant that the City would have to interact with other states for the coordination and use of disposal facilities located within their jurisdictions. However, this lesson was learned too late for the Giuliani administration, as the 1998 plan was pronounced “dead on arrival” by New Jersey officials, who were upset at the lack of notice given to them about the plan. As a result, the grand visions of the 1998 plan were never implemented (Clarke, 2001; Martin & Barry, 1998).

3.3.1.2 The 2000 Giuliani Plan. In May 2000, the Giuliani administration released its revamped comprehensive solid waste management plan. The planning and launch of the new plan was more carefully conducted, and this time around, opposition was much more tempered. According to the Comprehensive Solid Waste Management Plan Draft Modification, as it was officially known, the City vowed to keep each of the five boroughs “self sufficient” in managing their trash. It also supported maintaining the City’s current recycling, composting and waste reduction programs. Certain aspects of

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Although the free movement of solid waste across state lines is guaranteed by the Interstate Commerce Clause of the U.S. Constitution (and as affirmed by a variety of Supreme and lower court decisions), positive relations between NYC and the importing states is nevertheless important to maintain the smooth transfer of trash from origin to destination. The consequences of not maintaining this candor between government entities may result in situations such as the 2001 Operation Clean Sweep in Pennsylvania (Lipton, 2001; Luton, 1996; Podolsky & Spiegel, 1999).
the plan resembled Giuliani’s previous 1998 attempt. For example, the Bronx would continue to haul out its waste by rail (or possibly by barge), but a new transfer facility would be constructed to handle waste on a long-term basis. A private contractor would operate the facility. Staten Island’s waste would be transferred to railway containers in a new transfer facility to be built at the site of the Fresh Kills landfill.

However, unlike the 1998 Giuliani Plan, the new plan envisioned utilizing the City’s existing MTS system more thoroughly. Two MTSs in Brooklyn would be converted (and a new site developed in Queens) that would compact and containerize trash for direct transfer to barge or rail. A private vendor under contract would operate the new facility in Queens and one of those in Brooklyn. The City’s remaining five MTSs - one each in Brooklyn and Queens, as well as the three in Manhattan - would be used as they had been for years.\(^8\)

The five remaining MTSs would continue to be used as pass-through points from which DOS collection trucks would dump their loads into the City’s old barges. However, instead of delivering their raw waste to the Fresh Kills landfill, the barges would deliver their loads to a large, new EBUF to be located at Tremley Point in Linden, New Jersey. The Linden facility would be operated under contract with BFI and would compact, containerize and ship waste by rail (CSWMP, 2000; DOSAR, 2000; Lipton, 2000; O’Connell, 2001; Stewart, 2000).

\(^8\) Out of the City’s previous system of eight MTSs, seven were to be utilized under the 2000 Giuliani Plan. The eighth MTS, in the Bronx, would be abandoned, as the new truck-to-rail-or-barge facility would replace it (CSWMP, 2000).
The 2000 Giuliani Plan continued the same trend of planning an export-oriented long-term policy approach for the disposal of NYC's trash that the 1998 Giuliani Plan initiated. Final disposal for all of the City's trash would also be at out-of-state facilities.

However, although the 2000 Giuliani Plan was approved by the City Council and seemed to be on its way to realization, it was never implemented. The failure of the plan can be attributed primarily to New Jersey politics and the dilemmas surrounding the development of the BFI-Linden facility (as was discussed in Chapter 1).

3.3.1.3 Bloomberg Incineration Plan. After taking office in 2002, Michael Bloomberg made it known that he was intent on ending NYC's trash dilemma by finding a long-term solution to the interim practice of hauling most of the City's daily residential trash flow by truck to out-of-state landfills. In March, Mayor Bloomberg announced that the City would once again consider the option of using incineration to dispose of its waste. In explaining his WTE proposal, Bloomberg said that the cost of shipping the City's waste to out-of-state sites had risen dramatically and that he also expected tipping fees in the importing states to only grow in the coming years. Bloomberg also cited the strides in technological innovation that WTE plants had made in recent years. The new technology, Bloomberg reasoned, would make burning trash safer than ever before. The accompanying community opposition to the public health and environmental concerns was expected to be minimal (Johnson, 2002c).

Little is known about the Bloomberg administration's proposal to build new WTE plants for NYC's trash. It is apparent that public opinion in NYC and surrounding areas
had been gauged to assess the willingness of different areas to accept incinerators.\(^9\) Despite Bloomberg’s calculation that siting new incinerator facilities would be easier than in the past, this did not prove to be the case, and he conceded in May that his trash-burning idea was no longer being considered (Cardwell, 2002a).\(^{10}\) As a result, the Bloomberg Incineration Plan never evolved into a comprehensive management plan for the City’s solid waste.

**3.3.1.4 Bloomberg Retrofit Plan.** On July 31, 2002, Mayor Bloomberg announced the City’s new proposed approach to manage its solid waste disposal. The new plan differed from its predecessors by its sheer simplicity. Instead of building new EBUFs or constructing a series of incinerators, the new plan anticipates utilizing all of the City’s eight old MTSs and retrofitting them into facilities that will be able to compact, containerize and ship all of the City’s residential trash outflow. Only one new additional facility would need to be built, and would be located on Staten Island. From the eight MTSs and the new Staten Island facility, NYC’s trash would be compressed into conventional 20-foot shipping containers and transported by barge or rail to disposal facilities in other states (Cooper, 2002b; Lipton, 2002).

Like previous administration plans, the Bloomberg Retrofit Plan relies ultimately on disposal facilities in areas outside of New York State. However, unlike the other

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\(^9\) After Bloomberg announced that he was considering incineration as a disposal option for the City’s trash, a poll was conducted by Survey USA of New Yorkers’ feelings toward incineration. In the poll, 56 percent responded that they preferred to have incineration. However, the only other choice in the poll would be to re-open the Fresh Kills landfill. When asked about this option, only 26 percent preferred it to incineration (PR Newswire, 2002).

\(^{10}\) As was discussed in Chapter 1, there is a history of opposition to incineration in NYC. This, more than any other factor, turned out to be the greatest hurdle to Bloomberg’s incineration idea.
plans, the proposal keeps all of the transfer facilities under the ownership and management of the DOS. This would control costs by allowing the City flexibility in the future in deciding where it should send its trash for disposal, instead of being constrained by long-term contracts (Cooper, 2002b; MMR, 2002).

The idea behind the Bloomberg Retrofit Plan is not new. Many times in the past DOS had conducted studies to test the feasibility of converting some or all of the MTSs to full-fledged shipping centers. However, each time the Department concluded that physical constraints at some of the MTSs made it impossible to convert the facilities. The DOS also considered that the conversion idea was not cost-effective, would take too long to implement and would be hard to operate in an efficient manner (CSWMP, 2000; DOS RI, 2002; Martin, 1999a; O’Connell, 2001; OMBP, 1997; OWN/CPI, 2000; Purnick, 2002b). However, with increased costs, environmental damages, traffic, community protest, as well as a host of other pressures that came with the City’s continued reliance on the interim plan, the City decided to try to make the retrofit option work. Mayor Bloomberg claimed that improved technology would allow the new MTS system to work despite previous concerns (NYT, 2002b).

The Retrofit Plan addresses many of the shortcomings of the previous plans, especially by returning the City’s trash disposal system to the more cost-effective water-based form of transport. However, Bloomberg’s conceptual plans for overhauling the trash disposal system in NYC do not include any plans for recycling, composting and source reduction. Even more troubling in the short run, is that even though the Mayor has called for the plan to start operating within two years, and to be completed within four and a half, there is still uncertainty about whether the plan will even work. The DOS’s
consultants have released the design and engineering plan for the conversion of the MTSs, but only real-world testing will prove if the plan will provide a long-term solution to NYC’s trash dilemma (CCDD, 2002; Johnson, 2002d; NYT, 2002c).

In January 2003, six months after Bloomberg announced his intention to have the City’s MTS system retrofitted within two years, news began to surface that the plan would likely take an additional six years to complete. A senior DOS official, answering questions to the City Council, admitted that the plan would not only take longer to implement, but would cost as much $400 million (Christian, 2003). Only time will tell if Bloomberg’s retrofit idea will actually be put in place, or will fall short as previous ideas had. After enduring a few more years of the multiple costs of the interim trucking method, as well as the costly construction of converting the MTSs, the City may not tolerate another failed plan.

3.3.2 Reports from NYC Government Agencies, an NGO and a University

In the years following the announcement to close Fresh Kills, the inability of the government of NYC to develop and implement an effective alternative for the City’s trash disposal attracted the attention of many interested observers. Some of those interested in seeing the City implement a sound trash management plan decided to produce alternate plans of their own. These plans represented genuine options that the City could adopt as its policy. The following four plans represent different ideas for managing NYC’s solid waste stream. They were put forward by the Manhattan Borough President’s Office, the NYC Office of the Comptroller, an NGO named the Organization of Waterfront Neighborhoods and an interdepartmental team from Columbia University.
3.3.2.1 Manhattan Borough President Report. The Report of the Fresh Kills Task Force (released in December 1996) recommended that each of the five Borough Presidents assemble a team to assess the waste management needs and to provide solutions for their respective boroughs. In April 1997, each borough released its report for consideration by the public and NYC government. The themes and recommendations of all the reports were similar in content. The Manhattan report is representative of those reports. Its suggestions can be applied to the rest of the City (Clarke, 2001; Clarke et al, 1999; FKTF, 1996).  

The focus and strategy that the Manhattan report takes toward MSW management in its borough is quite obvious in its name alone: “Goodbye, Fresh Kills! or How the City Can Stop Worrying and Learn to Reduce, Reuse and Recycle.” The report recommended that all three existing MTSs on the island be utilized for the exportation of non-recyclable waste - but only after a vigorous program of reuse, recycling, composting and source prevention had been launched. In this way, the report’s authors pledged to devise a policy based on the waste management hierarchy that is promulgated by the US Environmental Protection Agency (EPA) and the laws of the State. According to the report, its key imperatives are to reduce the waste stream, increase the supply of recyclable materials, increase composting, stimulate demand for waste prevention and recycled products, and initiate a waste export program that is the most environmentally friendly (EPA530-F-99-038, 1999; OMBP, 1997).

11 While each borough produced its own distinctive report, only the Manhattan report was still readily obtainable. Therefore, the Manhattan report is the sole report that is examined in this study.
The Manhattan Report contains 33 pages of recommendations for the improvement of Manhattan’s waste management practices.\textsuperscript{12} The waste prevention goals that it proposes are to achieve a nine percent reduction by 2002, increase funding for DOS waste prevention activities, institute a variety of new programs to raise the profile of reduction in the public mind, support reuse and repair shops, foster waste prevention partnerships with businesses and minimize the disposal of household hazardous waste (OMBP, 1997).\textsuperscript{13}

The report’s recommendations regarding composting is to set a goal of composting two-thirds of Manhattan’s generated organic material, develop both centralized and decentralized composting facilities, encourage market development for compost, and promote public education programs on composting. The report also envisions a borough-wide recycling rate of 35 percent. To attain this level of diversion, the report recommends increased frequency of pickups, increased enforcement and public education of recycling, the institution of programs to increase City agencies’ recycling performance, increasing the type of materials accepted for recycling, increasing recycling opportunities in public places, and fostering markets for recycled materials in the region (OMBP, 1997).

\textsuperscript{12} The report also states many times the frustrations the Borough President’s Office encountered producing report. The authors appeared to be quite irritated that the Giuliani administration required them to produce their own waste management report, while at the same time not allowing them access to DOS and other City records. It is because of this, the authors note, that their report may seem less comprehensive than it otherwise should have been (OMBP, 1997).

\textsuperscript{13} This goal was originally set in the City’s 1992 Solid Waste Management Plan and was to be met by 1997 (OMBP, 1997).
After the amount of Manhattan's trash is reduced by the prevention, composting and recycling programs advised in the report, the report recommends maintaining the three MTSs on the island as a key component of the borough's waste removal system. The report concludes that the MTS should be used to containerize and to ready the trash for interstate export by barge or rail. As a final resting place for the borough's waste, the report states that disposal facilities in New York State should be secured, as to avoid any possible future interstate waste control legislation (OMBP, 1997).

Despite the efforts of the Manhattan Borough President's Office (as well as the four other boroughs) in preparing the report, at least one observer noted that City Hall has, in large part ignored its recommendations (Clarke, 2001).

3.3.2.2 Office of the Comptroller Report. In October 1999, the NYC Office of the Comptroller released its own report to provide a different strategy for redesigning the City's trash handling infrastructure in anticipation of Fresh Kills' closure. The Comptroller produced the report as part of his duty within City government to "undertake studies...[of] the adoption and use of new technology by city agencies to promote their economy and efficiency" (NYC Comptroller, 1999, p. 3). The report, titled "A Technology-Based Approach to Solid Waste Management in the Post-Fresh Kills Landfill Era," promoted an approach that is original and innovative.

The lone and simple recommendation the report advises the DOS to undertake is a conversion of its fleet of trash compactor trucks to a new design. The blueprint for the

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14 The NYC Comptroller is the Chief Financial Officer of the City and is an independently elected official. The Comptroller advises the Mayor, City Council and public on the City's financial condition. The Comptroller also manages the City's pension funds and conducts budget analyses, in addition to other duties (Comptroller website, 2003).
newly designed truck was created by the Comptroller’s Office and basically integrates a 20-foot shipping container into the cargo bed of the standard collection truck. The new design would pack the day’s trash directly into the shipping container. When full, the truck would be driven directly to the shipping depot, where the shipping container would be removed and transferred directly from the truck to barge, rail or long-haul semi-trucks. A new empty shipping container would then be inserted onto the truck. This concept, if adopted, would negate the need for the City to invest in the construction of a system of transfer stations—whether it is the creation of a few large EBUFs, or even the retrofit of the City’s MTSs. This is because it would eliminate the middle waste-processing step of compaction and containerization that these facilities would perform.

The Comptroller idea to redesign the City’s sanitation compactor trucks is a seemingly unsophisticated, yet effective and presumably economical way to ready the City’s residential trash outflow for export. However, the report did warn that the new design had only progressed to the conceptual stage, and its feasibility had not been tested in real-world applications. Thus, in many ways it resembles the variety of other trash plans that have been proposed for NYC in the last few years (NYC Comptroller, 1999).

According to an official in the Comptroller’s Office of Policy Management, after its release, the engineering designs in the Comptroller Report were never questioned for their feasibility. Furthermore, the Comptroller held a press conference detailing this idea, met with all borough presidents and sent an official copy of the report to the Giuliani administration. Since that time, the Comptroller has not received a response.
from City Hall about the idea (Nancy Anderson, personal communication, March 3, 2003).

3.3.2.3 Organization of Waterfront Neighborhoods Report. The Organization of Waterfront Neighborhoods (OWN) is an NGO that is a conglomeration of community groups and focuses on solid waste management issues in the City (Cooper, 2002b; O’Connell, 2001). OWN collaborated with another NGO, the Consumer Policy Institute of Consumers Union to produce its own version of what NYC’s trash disposal policies should resemble. In May 2000 - just after the announcement of the 2000 Giuliani Plan - OWN released its report, “Taking Out the Trash: A New Direction for New York City’s Waste.” According to the report, its goals are to create a solid waste system that is socially equitable, environmentally sound and economically viable (OWN/CPI, 2000).

The main component of the OWN Plan is a proposal to retrofit all of the City’s existing eight MTSs into facilities that will compact and containerize trash for immediate export. In addition, a new processing and recycling station would be built at the Fresh Kills landfill on Staten Island. From the MTSs and the new Staten Island facility, the containerized trash would be barged to nearby railway terminals such as Howland Hook on Staten Island or to terminals in New Jersey. From there, the City’s trash would be

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15 The Comptroller hired a former employee of DOS who was proficient in the truck fleet requirements of the Department. Therefore, the Comptroller is confident in the engineering integrity of the report (N. Anderson, personal communication, March 3, 2003).

16 By retrofitting the City’s MTS system, the OWN plan would make the DOS’s management practices more socially equitable by removing the land-based transfer stations that were placed in mostly low-income neighborhoods after Fresh Kills’ demise. Another major position of the OWN report is that the City’s commercial waste stream should be managed in an environmentally sound and socially equitable way. Although this is an important component in any discussion of NYC waste policy, it is beyond the scope of this report and will therefore not be discussed.
exported to out-of-state facilities. OWN also recommends that the MTS be kept under the control and ownership of the DOS.

Another major tenet of the OWN Plan is to maximize waste prevention, recycling and composting. The report insists that the City comply with its own Recycling Law of 1989 that mandated a 25 percent diversion rate by 1994, plus compliance with the New York State Solid Waste Management Act of 1988, which called for all municipalities "to achieve 10 percent waste reduction and 40 percent recycling by 1997." The City did not meet either of these legislative requirements.

To comply with the law and to adhere to OWN's recommendations, the report suggests expanding the type of materials the City accepts for recycling, as well as requiring full participation in the program, providing public recycling receptacles and improving the efficiency of recycling collection. The report suggests that the City also build its own recycling infrastructure, which would maximize the profits generated from recycling processing.\(^\text{17}\) OWN also suggests that City investment in the recycling and remanufacturing markets is good business and will improve the incentives for the City to increase its recycling diversion rates. Waste prevention would be encouraged through City-business partnerships, public outreach and programs at all City agencies. Opening several "thrift-type" centers throughout the City would expand opportunities for reuse.

The OWN report counsels that although it is in favor of exporting all of the City's waste that is non-recyclable, it should be done in an economically and environmentally sound manner. The City should limit the amount of trash that is sent to a single

\(^{17}\) OWN proposed that the City invest in creating its own recycling infrastructure (such as materials recovery facilities), which it currently has contracted out to private firms.
community, insist that none of its waste is shipped to incinerators and only sign contracts that provide the City with the economic incentive to recycle (OWN/CPI, 2000).\textsuperscript{18}

The OWN report apparently influenced the Bloomberg administration, which adopted its MTS retrofit as the key component of its current plan. However, many of the other recommendations in the OWN report, such as increasing recycling rates, evidently did not make it into Bloomberg’s plan (Cooper, 2002b).

3.3.2.4 The Columbia University Plan. In December 2001, an interdepartmental group at Columbia University produced a report that provided an academic approach to solving the City’s solid waste management problem.\textsuperscript{19} The report was titled, “Life After Fresh Kills: Moving Beyond New York City’s Current Waste Management Plan - Policy, Technical and Environmental Considerations.” The report “does not recommend any particular option” for managing NYC’s waste, but determines the best option the City can use to dispose of its waste in the most efficient and most environmentally responsible method.

The Columbia report examined the most common means for disposing of solid waste in the United States. These included waste diversion through recycling and composting, as well as landfilling and incineration in WTE plants. The report reviewed

\textsuperscript{18} The contracts that OWN suggests the City not sign are the so-called “put or pay” arrangements, which require the City to pay no matter how much waste is generated. For example, the contract might call for disposal services to be provided to the City for a certain amount of time. The City would be required to pay the agreed upon amount, regardless of the quantity of waste generated. On the contrary, OWN recommends that the City acquire a certain amount of landfill capacity. For example, if the City purchases 20-years worth of capacity at a given landfill, then this will encourage the City to divert more waste from going to the landfill, so as to increase the life span of the facility (OWN/CPI, 2000).

\textsuperscript{19} This interdepartmental group consisted of representatives from Columbia’s Earth Institute, Earth Engineering Center, and the Urban Habitat Project at the Center for Urban Research and Policy at the School of International and Public affairs (Columbia, 2001).
the possibility of operating a modern automated MRF for NYC, in conjunction with a new three-stream collection system.\textsuperscript{20} The MRF would separate different materials for recycling and send the residue away for landflling or incineration. The new system would also increase the recycling rate from 0.75 million tons to between 1.2 and 1.5 million tons per year, with a maximum achievable diversion rate of 40 percent. The report stated that using the technological sophistication and increased efficiency of the new MRF, the City would spend approximately $18.70 per ton of recyclables. This contrasts to the $50 per ton that the City paid to private MRF operators in 1999 to handle its waste. Therefore, the report concluded that the total cost of the MRF would be paid for within a few years, even if the recycled goods were given away.

After the three waste streams are separated at the MRF, 60 percent of the waste outflow is expected to remain. This sizable amount, which is neither recyclable nor compostable in any way, would have to be disposed of in a landfill or incinerated. After a thorough investigation comparing these two most popular disposal methods in the country, the Columbia report concluded that using modern WTE technology is environmentally superior to landfilling.\textsuperscript{21} Utilizing a WTE disposal method for NYC has many advantages, according to the report. First, the energy created from burning trash will help conserve non-renewable resources, while decreasing dependence on foreign

\textsuperscript{20} A MRF is a facility that either through manual or automatic processes, sorts out collected recyclable material into categories such as metal, aluminum and different types of plastic and glass.

\textsuperscript{21} The Columbia report investigated different WTE plants and the respective technologies they employ. After reviewing the environmental performance of the plants, as well as other factors, the report concluded that modern WTE facilities are vastly superior to their older predecessors and, when managed correctly, are actually more environmentally benign than most coal-fired electricity plants (Columbia, 2001).
sources of energy. Second, the emissions from landfills contain several times greater amounts of greenhouse gases than WTE plants. Third, a landfill may generate leachate for many years, fouling the surrounding environment. Fourth, WTE reclams many valuable metals, which conserves resources. Fifth, landfills proscribe the use of the land it inhabits in perpetuity for most uses. In contrast, incineration decreases the volume of MSW by about 90 percent, and therefore consumes much less land when buried.

Based on these findings the Columbia report concludes that “modern MRF and WTE technologies should be considered as tools of integrated waste management and offer various technical and environmental advantages over landfilling” (Columbia, 2001, p. B-32). Although the report does not formally recommend a specific plan for NYC to adopt for managing its waste, it is clear that the conclusions of the report endorse increased recycling and WTE as the best policy option. The report also advises that the siting of a solid waste facility should not be forced on any community, but rather incentives should be offered to encourage acceptance of facilities (Johnson, 2002c).

Steven Cohen, one of the Columbia report’s head authors, took this idea further with more specific terms. In an Op-Ed piece in the New York Times, Cohen suggested that NYC partner with economically depressed upstate New York State communities along the Hudson River. Cohen reasoned that in return for NYC siting a landfill in a locale, that community would receive economic incentives, such as inexpensive electricity or free trash collection services (Cohen, 2002). The vision of the Columbia

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22 Creating energy from solid waste can replace some of the foreign sources of energy when the WTE facility is located in an area of oil burning power plants.
plan can be seen as finding the most economical and environmentally acceptable solution to NYC’s trash problem while retaining waste management self-sufficiency.\textsuperscript{24}

### 3.3.3 Informal Plans

The “informal plans” discussed in this section are two ideas that have been considered during and after the closure the Fresh Kills landfill, but were never arranged into formal plans such as the ones that have been discussed up until this point.\textsuperscript{25} The ideas range from seemingly logical (upstate landfilling) to seemingly desperate (reopening Fresh Kills). However, both ideas have merit and have been proposed by different voices. A closer examination of them will reveal their true feasibility and possible consideration in NYC’s MSW policymaking.

#### 3.3.3.1 The Upstate Landfill Plan.

As NYC began to incrementally close the Fresh Kills landfill in 1997, trash from the Bronx was hauled via rail to rural Virginia for disposal in a landfill (Holloway, 1997). Subsequent diversions from the Staten Island landfill were shipped to other locations outside New York State. The reason that NYC did not choose to utilize the capacity located within its home state is one of economics: it is actually less expensive to send it across state lines (Martin & Revkin, 1999a). This

\textsuperscript{23} The drive to site WTE plants was likened to the siting of a sewage plant in West Harlem in the 1980s, in which the community agreed to have the plant situated in the area in return for a new state park (Cohen, 2002).

\textsuperscript{24} This type of drive toward utilizing incineration as a disposal method is consistent with the trends in New York State. Since 1986, the amount of trash burned in WTE plants has more than doubled (Lasoff, 2001).

\textsuperscript{25} A third radical idea that was floated during 2002 by the Bloomberg administration was to ship the City’s trash to a willing Caribbean nation. However, this thought was never given much serious attention and was met with disbelief in the press (Steinhauer, 2002a; NYT, 2002b). The one plan that is the sole exception is the Bloomberg incineration plan, which also never made it to the “formal” stages of development.
paradoxical difference is likely due to the lower value of land and the relative ubiquity of large landfills outside the state.

However, the idea of making upstate landfills the home for NYC trash did not disappear with the phase down of Fresh Kills. In early 1999, the City began to scout out areas in the northern part of the State as possible disposal sites. Although the price of exporting trash upstate had not diminished relative to the costs charged in other states, the political climate had changed such that a rethinking of the idea was necessary. In the previous year, the Giuliani administration had released its long-term plan to ship the City's trash to states along the eastern seaboard (the 1998 Giuliani Plan). As discussed earlier, this plan ignited fierce opposition in the proposed importing states to accepting NYC garbage. This opposition, along with the distinct possibility of interstate waste restrictions (imposed by federal legislation) disrupting the flow of trash convinced NYC officials to reinvestigate upstate New York as a disposal option (Rein, 1999).

In April 1999, the City was making plans to ship up to 15 percent of its residential trash to upstate landfills and incinerators (Miller, 2000; Rein, 1999). As recently as June 2001, the City was still investigating the feasibility of shipping its trash upstate (Cappiello, 2001). Despite this interest, and besides a small amount of trash coming from the Big Apple, upstate has seen very little NYC trash since the phase out of Fresh Kills (Rein, 1999). Part of the reason for the continued use of out-of-state facilities is the decline in capacity of waste disposal sites in New York State. From 1986 until 2001 the number of landfills in the State has declined from 294 to 28 (Cappiello, 2001; Lasoff, 2001). Furthermore, it has been estimated that with its current rate of landfilling, the State only has 10 years of remaining capacity at its existing landfills (Columbia, 2001).
Upstate communities that would likely be recipients of NYC’s trash added resistance to this already formidable impediment by voicing their opposition. The organized reaction in some communities may rival even those located in other states. Upstate communities do not want NYC’s waste just as much as any other community in the country (CCCC, 2002; OWN/CPI, 2000). Many of the 17 county and municipally-owned landfills in the State have restrictions barring any waste originating from outside the home county, which illustrates the point that many locales are against the importation of trash (Cappiello, 2001).

3.3.3.2 Reopening the Fresh Kills Landfill. Closing NYC’s last landfill did more than end the City’s era of in-house trash disposal, it led to an interim truck-based export method that has generated ever-mounting environmental, social and political costs. In addition, the City is spending $300 million more a year on export than it did to ship its waste to Staten Island (Punick, 2002a). These realities added up in 2002 to force a serious discussion in the City about the possibility of temporarily reopening the Fresh Kills landfill until a more permanent solution could be found.

Experts in the waste management field argued for and against the reopening of the landfill in Op-Ed articles in the New York Times. Detractors of the idea reasoned that Fresh Kills is an environmental disaster, and opening it would only add to the problem, and that the landfill was closed to right the wrong that had been inflicted on Staten Island for years. Supporters of the idea pointed out that using the landfill would save the City hundreds of millions of dollars, provide the City with at least 20 years’ worth of capacity, and also give the City better leverage in negotiations with its private haulers. They also pointed out that the landfill in recent years had been given substantial environmental
upgrades that are making the dump almost as safe as modern facilities (Clarke, 2002; Miller, 2002; Purnick, 2002a). The editorial staff of the *New York Times* even supported the landfill’s reopening (NYT, 2002b).

The option to once again use Fresh Kills, however was not considered a feasible one by members of the Bloomberg administration (Purnick, 2002a). A survey conducted during the debate showed that only 26 percent of City residents favored reopening the landfill (PR Newswire, 2002). In addition, the political wherewithal needed to put the facility back into service would be immense. The only legal way the landfill could reopen is by enacting the necessary legislation in the New York State Assembly (Purnick, 2002a). Finally, it must be remembered that the debate over Fresh Kills centers around using the facility only on a temporary basis. What NYC needs is a long-lasting, comprehensive solution to its current problem, not a stopgap measure. Therefore, using Fresh Kills once again would not solve the City’s trash crisis.

3.3.4 The “No Action” Scenario

One option for disposing of NYC’s trash is simply to rely on the status quo interim system as a long-term solution. After all, from the perspective of an average City resident, it would seem that there has been no difference in the quality of trash collection since the closure of Fresh Kills. The DOS crews and their compactor trucks still pick up trash as they always have, and the City has not become inundated with waste as a result of

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26 An argument could be made here that any plan to reopen Fresh Kills on a temporary basis would (not so sentimentally) hearken back to 1948, when Robert Moses promised that his new dumping grounds at the Fresh Kills creek and wetland area would only be temporary. However, if Fresh Kills were to reopen at the present time, it would have a measurable and foreseeable finite life span, which was not necessarily so apparent back in 1948.
Fresh Kills’ demise. The only difference is that instead of New Yorkers’ trash being buried within the City, it now finds a final resting place in states like Virginia and Pennsylvania. For all practical purposes, the interim export plan seems to be doing a fair job at what it is supposed to do: that is getting rid of the garbage.27

There may not be obvious drawbacks to the interim plan when viewed in this manner. However, it is the hidden havoc that comes as a result of the continued use of the interim method that makes it unsound. These hidden problems include, but are not limited to, the extra traffic that is caused by the City’s trash trucks having to travel extra miles to private transfer stations, the number of long-haul trucks leaving the City, the additional environmental damage (and public health consequences) that is incurred as a result of these trucks, the extra wear and tear on the DOS’s equipment and on the region’s transportation infrastructure, the social implications of having private transfer stations located in predominantly low-income areas, potentially frayed relations with neighboring states, the political vulnerability that comes with exporting trash to other states and the extra financial burden the City pays for the expensive interim plan (Johnson, 2002a; Lipton, 2001d; OWN/CPI, 2000).28

It is for these reasons that no serious consideration has ever been given to making the interim plan a real long-term plan by either the Giuliani or Bloomberg

27 The interim measure was designed solely as a stopgap measure to allow the phase down of Fresh Kills. In this respect, it excelled by allowing an orderly diversion of trash from the city landfill and by consequently having Fresh Kills close nine months early than was mandated (Johnson, 2001b).

28 The rising cost of the interim measure has been largely due to the price hikes by a largely consolidated and uncompetitive waste industry. The cost of exporting NYC’s trash has risen by 60 percent over the last three years and now costs the City an extra $300 million a year (as opposed to dumping at Fresh Kills). The cost of tolls alone, resulting from sending the DOS’s trucks to New Jersey transfer stations is $3.5 million a year (Lipton, 2001d; Miller, 2002).
administrations. The cost of the system is too great and many alternative ideas would eliminate or minimize most of these burdens. However, the inability of the City to implement a long-term comprehensive solid waste management plan since the closure of Fresh Kills has meant that the interim system has been the sole and unofficial policy for the disposal of NYC’s trash.

3.4 Characteristics of the Plans

The alternative plans discussed above each propose different methods for the disposal of NYC’s residential waste. A general overview of each plan is presented in Table 3.1. The table includes the name of each plan and the year each one was introduced. The table identifies the author of each plan and also describes their defining characteristics.
<table>
<thead>
<tr>
<th>Plan</th>
<th>Year</th>
<th>Author Affiliation</th>
<th>Focus of Plan</th>
<th>Type of Infrastructure</th>
<th>Final Resting Place of Trash</th>
<th>Ownership of Disposal System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>1998</td>
<td>City Administration</td>
<td>Export</td>
<td>* 3 large EBUFs</td>
<td>Out-of-state landfills</td>
<td>* EBUFs owned by DOS, operated by</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* 7 existing unmodified MTSs</td>
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<td>contractors</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>* New containerization/shipping sites in Bronx &amp; Staten Island</td>
<td></td>
<td>* MTSs owned and operated by DOS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* Trains, barges &amp; trucks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Giuliani II</td>
<td>2000</td>
<td>City Administration</td>
<td>Export</td>
<td>* 1 large EBUF</td>
<td>Out-of-state landfills</td>
<td>* EBUF &amp; two new facilities owned &amp;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* Retrofit of 2 MTSs &amp; 2 new facilities for containerization/shipping</td>
<td></td>
<td>operated by contractor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* 5 existing unmodified MTSs</td>
<td></td>
<td>* MTSs owned &amp; operated by DOS</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>* Bronx rail haul</td>
<td></td>
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<td></td>
<td></td>
<td>* Trains, barges &amp; trucks</td>
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<tr>
<td>Bloomberg</td>
<td>2002</td>
<td>City Administration</td>
<td>Incineration</td>
<td>* New WTE plants either within or outside NYC</td>
<td>Not Known</td>
<td>Presumably DOS</td>
</tr>
<tr>
<td>Incineration</td>
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<td>Bloomberg</td>
<td>2002</td>
<td>City Administration</td>
<td>Export</td>
<td>* Retrofit of all 8 MTSs for containerization/shipping</td>
<td>Out-of-state landfills</td>
<td>DOS</td>
</tr>
<tr>
<td>Retrofit</td>
<td></td>
<td></td>
<td></td>
<td>* New Staten Island facility</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* Trains, barges &amp; trucks</td>
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<tr>
<td>Manhattan</td>
<td>1997</td>
<td>Manhattan Borough President</td>
<td>Increase recycling, composting &amp; waste reduction</td>
<td>* Retrofit of existing MTSs for containerization/shipping</td>
<td>New York State landfills</td>
<td>DOS &amp; possibly private disposal sites</td>
</tr>
<tr>
<td>Report</td>
<td></td>
<td></td>
<td></td>
<td>* Export of remaining waste</td>
<td></td>
<td></td>
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<tr>
<td>Plan</td>
<td>Year</td>
<td>Author Affiliation</td>
<td>Focus of Plan</td>
<td>Type of Infrastructure</td>
<td>Final Resting Place of Trash</td>
<td>Ownership of Disposal System</td>
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<tr>
<td>Comptroller Report</td>
<td>1999</td>
<td>NYC Office of the Comptroller</td>
<td>* Redesign of DOS collection trucks * Export</td>
<td>* Redesigned DOS collection trucks * Existing MTSs or other existing shipping depots for direct shipping</td>
<td>Out-of-state landfills</td>
<td>DOS</td>
</tr>
<tr>
<td>OWN/CPI Report</td>
<td>2000</td>
<td>NGO</td>
<td>* Export * Existing City &amp; State recycling/reduction laws</td>
<td>* Retrofit existing eight MTSs * New Staten Island processing &amp; recycling facility * Trains &amp; barges * City owned recycling facilities</td>
<td>Out-of-state landfills</td>
<td>DOS &amp; possibly private disposal sites</td>
</tr>
<tr>
<td>Columbia Report</td>
<td>2001</td>
<td>University</td>
<td>* High recycling rate * Incineration * Emphasis on City self-sufficiency</td>
<td>* New, state-of-the-art MRF * New WTE plants sited in upstate New York through incentives * Existing MTSs &amp; barges</td>
<td>Presumably within New York State</td>
<td>DOS</td>
</tr>
<tr>
<td>Upstate Landfills</td>
<td>1999</td>
<td>City Administration</td>
<td>Disposal at upstate landfills</td>
<td>* Trains, barges &amp; trucks</td>
<td>New York State landfills</td>
<td>DOS &amp; other government entities, as well as contractors</td>
</tr>
<tr>
<td>Reopen Fresh Kills</td>
<td>2002</td>
<td>News Media</td>
<td>Temporary reuse of the Fresh Kills landfill</td>
<td>* Existing MTSs and barges</td>
<td>Fresh Kills landfill</td>
<td>DOS</td>
</tr>
</tbody>
</table>

Table 3.1 Overview and Characteristics of Plans (continued)
CHAPTER 4

RANKING THE ALTERNATIVE SOLID WASTE PLANS

In the six years that have elapsed since Mayor Rudolph Giuliani announced that NYC’s last in-house disposal method would close, the eleven alternative plans discussed in the previous chapter were proposed by a diverse group of interested parties. This illustrates the exigency of the problem facing the City and also the failure of the NYC planning process to formulate a successful phase-over to alternative methods of trash disposal. The inability of successive mayoral plans to solve the City’s trash crisis has led outside interests to suggest their own trash plan panaceas. However, instead of enlightening the debate over NYC’s waste management future and shining a guiding light toward trash wisdom, these interested parties have tended to cloud the discussion by insisting that only in each of their own plans lie the City’s salvation. The average NYC resident and casual observers are left to wonder which alternative plan is truly in the City’s best interest.

As a result, it is necessary to evaluate the alternative plans side by side and to determine which one provides the foremost working framework for the City to adopt. Although one may devise an unlimited number of criteria by which to judge each plan, a set of guidelines delineated in this chapter will reveal the alternative plan best suited for NYC. The parameters against which each plan is measured are based on the assumption that the following points are valid for determining the best alternative:

• greatest cost-effectiveness in both short- and long-term measures
• greatest ability to allow flexibility to incorporate technological advances
• reliance on proven technology
• provision for all or most control of system by DOS
• minimal environment impact

4.1 Criteria for Judging the Plans

More elaborately, these parameters ensure that a plan will be chosen that makes sense economically for the City in terms of capital, annual operating and long term costs. The long-term costs are calculated through a 30-year time frame, which would conform to other serious infrastructure developments planned for and by a large government entity such as NYC. The parameters also stipulate that to be considered a practicable alternative, a plan must be able to adapt to technological changes in the waste management industry that would improve the operation of the plan. In other words, if the setup of a particular plan is made instantly obsolete by new innovations and the plan cannot incorporate the changes, then obviously that plan should not be considered as a long-term solution.

One aspect of substantial importance, yet is likely to be overlooked, is the tendency to rely on imaginative technological fixes that have not been proven in real-world applications. Therefore, a plan must incorporate methods of refuse disposal that have a proven record and are considered to be “tried and true.” The 4.5 million tons of trash produced yearly by the households of NYC creates a trash flow that should not be experimented on with unproven technology (Columbia, 2001).

Another important determinant for judging the eleven proposed plans is the ability of the DOS to control some or all of the waste disposal process and infrastructure. As was detailed in Columbia (2001) and discussed by Miller (2002), a largely consolidated
and uncompetitive waste industry has been responsible for an increase of 60 percent in disposal costs for NYC since the phase down of Fresh Kills commenced. The way to ensure relative stability in disposal costs and to maintain a level of service to which New Yorkers have become accustomed over the past 50 years is for the DOS to regain control of all or part of its waste disposal system.

Although any plan that can operate in a cost-effective manner, is able to incorporate new technological innovations while relying on a foundation of proven ones, and can be owned and/or controlled by DOS may appear to solve the City's trash dilemma, one other essential condition must be met to be considered a serious candidate. The potential environmental risks stemming from the trash disposal of America's largest city are enormous, including polluted groundwater and ruined landscapes. Therefore, a twenty-first century waste management plan that promises to provide excellent results to NYC must also guarantee a high level of ecological protection.

The following tables and accompanying explanations rate each of the eleven plans based on the criteria listed above. The analysis here suggests a future plan that will render NYC's trash problems a peculiarity of the past.

4.1.1 Financial Analysis

Table 4.1 provides a financial synopsis of all eleven proposed solid waste management plans. The figures given for the plans were taken from details of the plan itself (such as the Giuliani II plan), or have been extrapolated from similar data in other plans (such as was done with the Manhattan Report). The figures do not represent a comprehensive analytical depiction of what each plan entails, rather basic calculations were performed to
arrive at "ballpark" numbers for capital, annual operating and total 30-year expenditures.\(^1\)

The calculations for deriving the data in Table 4.1 can be found in the Appendix.

A number in parentheses accompanies the cost that each plan incurs in each category. This number represents the rank that is given, in descending order, to each plan in that category. Since there are eleven plans, the number 1 would be the least desired and the number 11 the most desired. Rankings are based solely on the costs of the various plans - the less expensive the option, the higher the rank (and number) it will receive. For example, in the first column depicting capital costs, the so-called status quo option is rated highest (11), while Bloomberg Incineration is rated lowest (1).

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\(^1\) The calculations did not include variations accounting for expected inflation, contingencies, interest and other charges. Rather, the present value of the 30-year expenditures of each plan was assessed using a discounting rate of 5 percent annually. They also do not account for expected fluctuations in the price of waste disposal over the next three decades.
Table 4.1 Financial Assessment of Alternative Plans

<table>
<thead>
<tr>
<th>Plan</th>
<th>Capital Investment</th>
<th>Annual Operating &amp; Maintenance</th>
<th>30-Year Total Expenditures</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>$158 million (8)</td>
<td>$233 million (5)</td>
<td>$3.74 billion (6)</td>
<td>6.3</td>
</tr>
<tr>
<td>Giuliani II</td>
<td>$181 million (7)</td>
<td>$335 million (2)</td>
<td>$5.331 billion (2)</td>
<td>3.7</td>
</tr>
<tr>
<td>Bloomberg Incineration</td>
<td>$2.4 billion (1)</td>
<td>$516 million (11)</td>
<td>$5.532 billion (11)</td>
<td>7.7</td>
</tr>
<tr>
<td>Bloomberg Retrofit</td>
<td>$474 million (6)</td>
<td>$236 million (4)</td>
<td>$4.101 billion (4)</td>
<td>4.7</td>
</tr>
<tr>
<td>Manhattan Report</td>
<td>$474 million (6)</td>
<td>$264 million (3)</td>
<td>$4.532 billion (3)</td>
<td>4.0</td>
</tr>
<tr>
<td>Comptroller Report</td>
<td>$0.00 (10)</td>
<td>$167 million (7)</td>
<td>$2.568 billion (7)</td>
<td>8.0</td>
</tr>
<tr>
<td>OWN/CPI Report</td>
<td>$594 million (4)</td>
<td>$213 million (6)</td>
<td>$3.868 billion (5)</td>
<td>5.0</td>
</tr>
<tr>
<td>Columbia Plan</td>
<td>$1.78 billion (2)</td>
<td>$369 million (10)</td>
<td>$3.892 billion (10)</td>
<td>7.3</td>
</tr>
<tr>
<td>Upstate Landfills</td>
<td>$792 million (3)</td>
<td>$100 million (8)</td>
<td>$2.329 billion (8)</td>
<td>6.3</td>
</tr>
<tr>
<td>Reopen Fresh Kills</td>
<td>$0.00 (9)</td>
<td>$100 million (9)</td>
<td>$1.537 billion (9)</td>
<td>9.0</td>
</tr>
<tr>
<td>Status Quo</td>
<td>$0.00 (11)</td>
<td>$400 million (1)</td>
<td>$6.149 billion (1)</td>
<td>4.3</td>
</tr>
</tbody>
</table>

The final column in Table 4.1 lists the average ranking of each plan. This number is the most important figure overall in the table; it shows the overall cost effectiveness of the plans by combining the rankings of all three columns with a resultant composite number. The higher the average in this column, the more desirable the plan is from a financial point of view.

The highest ranking for capital outlay expenses is conferred to the status quo plan. This plan would not require any new capital projects, however, these "would-be" costs appear to be transferred to the annual operating cost column, which appear in high landfill tipping fees. (Although three plans are listed as imposing "zero" capital costs - status quo, Comptroller Report and reopening Fresh Kills - they are all rated as 11, 10 and 9...
respectively. The reason for this is that while all the costs may be close to zero, actual, non-capital costs associated with these plans may vary.) The lowest ranking plan in this category is the Bloomberg Incineration plan. The high capital cost of this plan is attributed to the necessity to construct a greatest number of WTE plants, which are a result of low recycling rates associated with the plan. The second most expensive plan from a capital cost perspective is the Columbia Plan. While this plan calls for the construction of MRFs to capture a high rate of recycling, a lower number of WTE plants are needed as a result, as well as less capital costs.

In essence, the capital cost requirements of each plan reflect the relative costs of their respective infrastructure requirements. For example, the three plans not requiring any (or minimal) infrastructure development are not subject to any capital costs. However, the first and second Giuliani plans have higher capital costs. These plans rely mainly on a network of one or more EBUFs to ship waste. The next tier in costs is represented by the plans calling for retrofitting the City’s MTSs - Bloomberg Retrofit, the Manhattan Report, and the OWN Plan. Next on the list is the only plan mandating that new landfills be sited by the City itself, the Upstate Landfills option. Finally, the highest tier is occupied by the two incineration plans.

Interestingly, when viewing the second category in Table 4.1 - annual operating costs - the opposite ranking is reflected from the first column. As mentioned earlier, the absence of capital costs for the status quo plan is reflected in the high annual cost of cumulative landfill tipping fees. In this case, the high tipping charges make the status quo the most expensive plan on an annual basis. Conversely, the Bloomberg Incineration plan is the least expensive on a yearly basis. In fact, the plan actually produces revenue from
selling generated electricity and recovered metals. This is also true for the Columbia Plan, which ranks second highest for annual operating costs (the revenue from these two plans are depicted in bold to differentiate them from the costs of the other plans). As expected, the idea to reopen Fresh Kills ranks high at number 9 in this category. This demonstrates the relative cost effectiveness that the City had at its disposal for the last 50 years while the landfill was in operation. Utilizing upstate landfills comes a close second, with the extra costs for disposal originating from extra transportation costs to these locations. Ranking 7 is taken by the Comptroller Report, which does not need to rely on expensive transfer stations to move waste. The next five more expensive annual costs are taken, in order, by the OWN Report, Giuliani I, Bloomberg Retrofit, the Manhattan Report and Giuliani II. As already mentioned, the status quo is the most expensive annual choice.

The third column provides an overall financial ranking of the alternative plans and is based on their total costs over a 30-year period. This column produces the same outcome as the second column; Bloomberg Incineration is ranked highest and status quo is ranked lowest. Not surprisingly, the similar Columbia Plan ranks second highest in cost effectiveness. The Giuliani II plan ranks second lowest. In general, the rankings for the 30-year period reflect that of the annual operating cost rankings. The only exception

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2 The higher revenue earned under the Bloomberg Incineration plan over the Columbia Plan are testament to a common theme in a modern economy - that greater profit usually goes hand in hand with less environmentally conscious behavior. In this case, incineration in the Columbia Plan actually makes less profit than the Bloomberg plan based simply on the fact that the latter plan includes less recycling and therefore more trash flowing to the incinerator, which increases profits.

3 Although the ranking scheme for this financial assessment is used to produce an average score of the plans, the similarity between the second and third columns' rankings effectively mean that the average scores are heavily weighted from the 30-year total expenditures.
is that the first Giuliani Plan and the OWN Report have switched places, so that the former incurs slightly less costs over 30 years. The calculations over a 30-year planning period show that capital costs are a small portion of the overall cost in these waste management scenarios. Thus, choosing an alternative plan while trying to avoid high start-up costs may lead to larger costs down the road, as is the case with the status quo. As Rathje and Murphy (2001, p. 240) point out, “in the management of garbage disposal, adopting cheap solutions is usually a prelude to encountering expensive surprises.”

The final column depicts the averages of the alternative plans. As mentioned earlier, the higher the number in this column, the more desirable the alternative is from a financial perspective. The plan with the highest average is reopening Fresh Kills, the plan with the lowest is Giuliani II.

Although these financial numbers provide an important element in determining an alternative plan, it must be remembered that these numbers represent strictly a financial analysis. The subsequent sections add the weight of other factors for determining the best plan.

4.1.2 Inherent Technological Flexibility

Although financial assessments may be able to determine the overall cost of a waste management plan, they may be poor prophets when it comes to anticipating the introduction of new technology. The likelihood that significant innovations in trash disposal will occur over the next three decades is unknown, but implementing a policy that may be able to incorporate projected advances is strongly preferred. Planned
obsolescence (intentional or unintentional) is not an asset in a long-term management plan.

**Table 4.2** Flexibility in Adapting to Technological Changes/Innovations

<table>
<thead>
<tr>
<th>Table</th>
<th>Transportation System</th>
<th>Disposal System</th>
<th>Materials Recovery</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Giuliani II</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>Bloomberg Incineration</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>Bloomberg Retrofit</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>Manhattan Report</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Comptroller Report</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>OWN/CPI Report</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>Columbia Plan</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Upstate Landfills</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Reopen Fresh Kills</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Status Quo</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Table 4.2 measures the relative flexibility that each alternative plan is expected to encounter with technological advances. The table divides each plan into its respective transportation system, final disposal system and its ability to adapt to expanded materials recovery automation, which are the aspects technological innovation would impact. Scores are given on a 1.0 to 3.0 scale, 1 equals low rating, 2 equals medium rating and 3 equals high rating.
A final column tallies up the average score of each plan and presents a picture of expected relative technical flexibility. The higher the number in this column, the more desirable the alternative is from a flexibility perspective.

In the transportation system column, the highest score of 3.0 was given to the plans incorporating designs to retrofit the City's MTS system. These plans - Bloomberg Retrofit, Manhattan Report, OWN Plan, as well as the Comptroller Report - all call for trash to be compacted into shipping containers within the City. These intermodal steel shipping containers are standard internationally. It is likely that any changes in the transportation industry will result in the continued use of these containers. Therefore the four plans that utilize these containers will not find their transportation methods obsolete in the future, and they all earn a score of 3.0. The first and second Giuliani plans also received a 2.0 because the majority of the City's waste was to be transferred to shipping containers via EBUFs. The Bloomberg Incineration, Columbia Plan and Upstate Landfill plan all merit a 2.0 because the type of transportation system to be used was not delineated. Reopening Fresh Kills was given a score of 2.0 because the proximity of the disposal site to the waste generators is so close that it negates any need to change its barge-based method. The status quo uses a truck-based system to handle the City's raw waste without transferring it to shipping containers first. The lack of transfer stations and shipping containers makes this the only plan less able to adopt to new advances in technology, and the only plan to earn a score of 1.0.

The ability of each plan to adapt to new disposal methods also varies greatly. The plans relying mainly on containerization and/or compaction - the first and second Giuliani plans, Bloomberg Retrofit, Manhattan Report, Comptroller Report and OWN Plan - all
received a score of 3.0. This is due to the fact that all may be able to redirect their waste flows to different disposal methods with relative ease. The Upstate Landfill option, Reopening Fresh Kills, and the status quo all earned a 2.0. Although the City would invest heavily in upstate landfills, its full control over their operation would allow the system to be stopped or suspended relatively easily. Reopening Fresh Kills also gives the City full flexibility to stop operations and switch to a different disposal method. However, the current problem is the inability for the City to find a replacement for Fresh Kills. There is not much reason to believe that this would be much easier in the future, even in the presence of new technology. The status quo also received a 2.0 score because it is only tied to short term contracts, which allows flexibility, but lacks the infrastructure to switch methods easily. The only plans receiving the lowest score of 1.0 are the two incineration plans. These plans – the Bloomberg Incineration and Columbia Plan - both require substantial capital costs to construct a specific disposal method. Deviating from this method would not be easy.

The recovery of materials for recycling is a practice that employs different methods in different cities. Some recycling centers - MRFs - sort through materials manually, others automatically, while most use a combination of both. Technology in this area is likely to improve and an established recycling system is a requirement in order to get a head start for incorporating any new advances. This is why the two plans, which call for MRFs to be owned and controlled by the City - the OWN Report and Columbia Plan - are the only ones to receive a 3.0 (Columbia, 2001; OWN/CPI, 2000). All the plans that were either formulated during the time NYC still actively sought to attain a City-mandated diversion rate of 25 percent received a 2.0. (The exception to this is the
Manhattan Report, which calls for a 35 percent diversion rate, yet relies mostly on upgrading the City's current programs.) The four plans which did not specify a set recycling goal, or were formulated since the scale-back of the City's recycling program (to include only paper and metal, and has resulted in an overall recycling rate of 10 percent), were all given a score of 1.0 (IBO, 2002b). These plans include the Bloomberg Incineration, Bloomberg Retrofit, Reopening Fresh Kills and status quo plans.

The one plan receiving the highest average rating, a 3.0, is the OWN Report. This plan is the most adept at adapting to technological changes. The transportation, disposal and materials recovery systems in this plan offer the most technical flexibility for modification in the future. In second place are the Manhattan and Comptroller Reports, which both received a 2.7. The lowest ranking average is the status quo and Bloomberg Incineration (both with an average of 1.3), which do not appear well suited for technological changes.

4.1.3 Technological Feasibility

Technological feasibility measures the extent to which a plan employs "tried and true" technology. A plan may be devised that solves all of the City's trash woes, but attempts to implement them by using methods that have never been tested in real world applications may lead to failure. Technological feasibility differs from technological flexibility in that the former is a measurement of a plan's use of existing technology, while the latter tests a plan's ability to adapt to technological change.

Table 4.3 assesses the technological feasibility of the alternative plans' transportation and disposal systems. As with technological flexibility, the plans are rated
on a 1.0 to 3.0 scale, with 3.0 being the best. In this exercise, no plan received a medium score of a 2.0; it was “all or nothing.”

**Table 4.3** Technological Feasibility

<table>
<thead>
<tr>
<th>Plan</th>
<th>Transportation System</th>
<th>Ultimate Disposal System</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Giuliani II</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Bloomberg Incineration</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Bloomberg Retrofit</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Manhattan Report</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Comptroller Report</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>OWN/CPI Report</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Columbia Plan</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Upstate Landfills</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Reopen Fresh Kills</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Status Quo</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Most of the plans received a 3.0 for their transportation systems and include both Giuliani plans, Bloomberg Incineration, Columbia Plan, Upstate Landfill option, Reopening Fresh Kills and the status quo. All these plans call for either a system based on exporting trash by proven transport methods, such as truck, train or barge, or outline a disposal method that is in or near the City. However, all four plans that recommend redeveloping the City’s MTS system into compaction and containerization stations all received a 1.0. The reason for this is that although the plan has the backing of the mayor, and is currently the method chosen to solve NYC’s trash problems, the feasibility of the plans is not guaranteed. When Mayor Bloomberg announced in the summer of 2002 that
he decided to go with his own version of the retrofit option as a long-term strategy to manage the City’s waste, he admitted that he was not even sure if it would work (Lipton, 2002). Interestingly though, all eleven of the plans earned a perfect score of 3.0 when it came to the final disposal method. This is due to the fact that all rely on either landfilling or incineration - two technologies that have been used extensively in the past and have proven their worth. This has produced an average tally on the technological feasibility scale that places all plans at the top, except for the retrofit options.

4.1.4 Administrative Controllability

As mentioned earlier, the DOS has proven competent to manage the City’s trash when it is departmental staff that is in total or majority control of the disposal system. Since this fact changed with the closure of Fresh Kills, prices have skyrocketed and service has been below previous levels (Lipton, 2001e; Miller, 2002). Experience suggests that it is to the City’s advantage to maintain as much control over its trash disposal system as is possible. Administrative controllability acts as a yardstick to measure the amount of control that each plan would allow the DOS over the fundamental steps in the disposal process: transportation to disposal site and the ultimate disposal system.4

Table 4.4 provides an overview of the outcome of each of these categories when they are applied to the eleven alternative plans. The last column is an average of the plans’ separate scores and provides an overall score for the administrative controllability.

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4 The collection of trash and its transport within the City are also important aspects of the disposal process that need to be under DOS control. However, in this assessment, all plans call for complete control of both of these services to go to the DOS. Therefore, they are not included in the assessment depicted in Table 5.
measure. As was the case with the previous two assessments, the scale used is from 1.0 to 3.0, with 3.0 being the best.

Table 4.4 Administrative Controllability

<table>
<thead>
<tr>
<th>Plan</th>
<th>Transfer Stations &amp; Equipment</th>
<th>Transportation to Disposal Site</th>
<th>Disposal Site Operations</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>Giuliani II</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>Bloomberg</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Incineration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bloomberg</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Retrofit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manhattan Report</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Report</td>
<td></td>
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<tr>
<td>Comptroller</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWN/CPI Report</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia Plan</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstate Landfills</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>Fresh Kills</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>Status Quo</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

All of the plans except for three received a perfect score in the transfer station column. These plans either include transfer stations under DOS control or do not necessitate the need for transfer stations at all. Both Giuliani plans received a score of 2.0 because they combine both DOS and contractor control over transfer stations. The status quo received the only score of 1.0 in this column because it utilizes a transfer station system completely dependent on private companies.

In the transportation to disposal column, eight of the eleven plans scored a 1.0. These plans included Giuliani I and II, Bloomberg Retrofit, Manhattan Report,
Comptroller Report, OWN Report, Upstate Landfill plan and the status quo. These plans rely on contractors to ship the City's waste to out-of-state landfills. The plans that do not specifically mention hiring contractors were included by default because the necessity of outsourcing is evident by the distant location of the disposal sites. The remaining three plans - Bloomberg Incineration, Columbia Plan and reopening Fresh Kills - were all given scores of 3.0. The commonality among these three alternatives is that they all call for disposal at landfills or incinerators that would theoretically be located close to the City. In this way, the DOS would be able to control delivery of the trash to these locations itself via barge or truck.

At the final disposal site, the controllability of the disposal site was judged for each plan. Seven of the plans in this column – Giuliani I and II, Bloomberg Retrofit, Manhattan Report, Comptroller Report, OWN Report and the status quo – received a score of 1.0. These seven plans rely completely on a system of privately owned and operated landfills or incinerators. Both incineration plans – Bloomberg Incineration and Columbia Plan – received a 2.0 because while the City may be able to own the facilities, it is unlikely that they have the personnel that have the technical expertise to run them. Thus, the operation of these City-owned WTE plants would likely be outsourced.

When the average score of the administrative controllability assessment is calculated, reopening Fresh Kills proves to be the best choice for DOS control with an average score of 3.0. This was followed by two plans scoring 2.7 - Bloomberg Incineration and the Columbia Plan. The next most desirable plan was the Upstate Landfills option, with an average of 2.3. Next, with 1.7 points were all plans calling for retrofit of the MTSs - Bloomberg Retrofit, Manhattan Report, Comptroller Report and the
OWN Plan. Both Giuliani plans that had a final score each of 1.3 followed these alternative plans. The status quo option proved to be the least controllable for DOS and consequently received a total score of 1.0.

4.1.5 Environmental Performance

Economic, technologic and administrative considerations are imperative for deciding which alternative plan should be chosen as accepted policy for the disposal of NYC's solid waste. However, one of the most important elements for developing a successful solid waste disposal system is the incorporation of rigorous environmental performance standards into the planning process. Any plan that manages NYC’s solid waste in an environmentally inferior way cannot be considered a legitimate option.

Table 4.5 reports the relative environmental performance measures of each of the alternative plans. The table is broken down into three categories that assess the environmental responsibility of the respective plans' proposed disposal method, recycling program and transportation system. The table uses the same scale as the previous tables in this chapter. A final column provides an average view of the ecological level at which each plan is expected to perform.
Table 4.5 Environmental Performance

<table>
<thead>
<tr>
<th>Plans</th>
<th>Disposal Method</th>
<th>Recycling Program</th>
<th>Transportation System</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Giuliani II</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>Bloomberg</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Incineration</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Bloomberg</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.7</td>
</tr>
<tr>
<td>Retrofit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manhattan</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2.7</td>
</tr>
<tr>
<td>Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comptroller</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWN/CPI</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>Report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td>Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstate</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Landfills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reopen</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1.7</td>
</tr>
<tr>
<td>Fresh Kills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Status Quo</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1.3</td>
</tr>
</tbody>
</table>

The plans that received a perfect score of 3.0 in the disposal method category are the two incineration plans. It is now becoming widely accepted that WTE, with the appropriate ecological controls, is the environmentally superior waste disposal technique of all the major methods (Columbia, 2001; Tammemagi, 1999; Themelis et al, 2002). All the plans that received a score of 2.0 - the remaining plans besides reopening Fresh Kills - all propose to bury the City’s waste in landfills in accordance with current environmental laws. The plan to reopen Fresh Kills received a 1.0 because, as discussed earlier, the landfill, although much improved in recent years, is considered an environmental problem (Rathje, 2001; Tammemagi, 1999).
To be considered environmentally responsible, any plan must contain some semblance of a recycling component. This however, is not the case with many of the proposed plans. Giuliani I and Bloomberg Incineration both do not detail any plans for recycling. Bloomberg Retrofit, reopening Fresh Kills and the status quo all rely on the existing 12 percent recycling rate, which is far below a currently acceptable recycling level for a major American city. Therefore, these five plans all received scores of 1.0. Giuliani II, Comptroller Report, OWN Plan and the Upstate Landfill option all explicitly call for or were devised during the city-mandated goal to achieve a 25 percent recycling rate (with the assumption that this would be the plans' diversion goal). As a result, these plans all received scores of 2.0. The only plans to receive a 3.0 were the Manhattan Report and Columbia Plan. These plans call for diversion rates of 35 and 40 percent, respectively.

Another important element in evaluating a plan's environmental performance is the method of transport used to haul waste from the City to disposal site. In general, water transport, trains and trucks are the descending order of environmental preference (and cost) for shipping long distance. Plans that primarily use the environmentally preferred methods (boats and trains), all receive a score of 3.0. These plans include both Giuliani plans, Bloomberg Retrofit, Manhattan Report, Comptroller Report, OWN Plan and reopening Fresh Kills. Plans that did not define their preferred method of waste transport - Bloomberg Incineration, Columbia Plan and Upstate Landfill plan - were

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The plans that utilize barges for transportation would employ nets or other devices to prevent trash from being blown into the surrounding water by wind or other movement.
awarded a 2.0. The last remaining plan, the status quo received a 1.0 for its almost complete reliance on trucks to transport the City's waste.

The plans that received the highest score when the average of the three columns are taken are the Manhattan Report and the Columbia Report, both of which scored 2.7. On the other side of the spectrum, the status quo received the lowest average environmental performance score, at 1.3.

4.2 Combined Ranking of Plans

Up until this point, the analysis has rated each of the plans based on specific criteria such as economic or environmental considerations. This section portrays the overall and final ranking of the plans by taking into account all of the above measurements and combining them to choose the best option.

Table 4.6 depicts the grand total of the averages of all the plans. The higher a ranking number a plan receives, the more desirable it is. The plans are then correspondingly ranked on a 1 to 10 scale, with 10 being the highest and 1 being the lowest (the scale does not reach 11, as a pair of plans have equal scores and hence equal ratings). When all criteria are considered equally, reopening Fresh Kills, with a rank score of 10, is the most attractive option for managing NYC's waste dilemma. This is followed by the Columbia Plan (ranking score of 9) and the Bloomberg Incineration and Comptroller Report (tied with a ranking score of 8). In this analysis, I will consider reopening Fresh Kills, the Columbia Plan, and the Comptroller Report to be the three highest ranked plans, respectively. I have chosen to ignore the Bloomberg Incineration proposal because it is so similar to the Columbia Plan, which is ranked 9.

6 On the other end of the scale, the
status quo is considered the least preferred plan for the City to adopt on a permanent basis (with a ranking score of 1). This reinforces the urgency to find an alternative to the current situation.

In conclusion, reopening Fresh Kills is the superior choice for solving NYC’s waste crisis. Close runners-up include the Columbia Plan, Bloomberg Incineration and Comptroller Report. Although this chapter has provided an objective means for choosing a worthy alternative, it does not take into account the complicated political atmosphere present in NYC that in many ways play a more important role in determining policy than the criteria presented here. The final chapter will investigate these considerations and determine the political feasibility of applying the most suitable alternatives established here to NYC in the twenty-first century.
Table 4.6 Final Ranking of Alternative Plans

<table>
<thead>
<tr>
<th>Plans</th>
<th>Table 2 Costs</th>
<th>Table 3 Technical Flexibility</th>
<th>Table 4 Technical Feasibility</th>
<th>Table 5 DOS Control</th>
<th>Table 6 Enviro. Perform.</th>
<th>TOTAL &amp; RANKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giuliani I</td>
<td>6.3</td>
<td>2.3</td>
<td>3.0</td>
<td>1.3</td>
<td>2.0</td>
<td>14.9</td>
</tr>
<tr>
<td>Giuliani II</td>
<td>3.7</td>
<td>2.3</td>
<td>3.0</td>
<td>1.3</td>
<td>2.3</td>
<td>12.6</td>
</tr>
<tr>
<td>Bloomberg Incineration</td>
<td>7.7</td>
<td>1.3</td>
<td>3.0</td>
<td>2.7</td>
<td>2.0</td>
<td>16.7</td>
</tr>
<tr>
<td>Bloomberg Retrofit</td>
<td>4.7</td>
<td>2.3</td>
<td>2.0</td>
<td>1.7</td>
<td>2.0</td>
<td>12.7</td>
</tr>
<tr>
<td>Manhattan Report</td>
<td>4.0</td>
<td>2.7</td>
<td>2.0</td>
<td>1.7</td>
<td>2.7</td>
<td>13.1</td>
</tr>
<tr>
<td>Comptroller Report</td>
<td>8.0</td>
<td>2.7</td>
<td>2.0</td>
<td>1.7</td>
<td>2.3</td>
<td>16.7</td>
</tr>
<tr>
<td>OWN/CPI Report</td>
<td>5.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.7</td>
<td>2.3</td>
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<tr>
<td>Columbia Plan</td>
<td>7.3</td>
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<td>3.0</td>
<td>2.7</td>
<td>2.7</td>
<td>17.7</td>
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<td>Upstate Landfills</td>
<td>6.3</td>
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<td>3.0</td>
<td>1.7</td>
<td>18.4</td>
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<td>Status Quo</td>
<td>4.3</td>
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<td>3.0</td>
<td>1.0</td>
<td>1.3</td>
<td>10.9</td>
</tr>
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</table>
CHAPTER 5
WASTE REDUCTION IN NYC

5.1 Introduction to Waste Reduction

Any comprehensive long-term solid waste management plan that is adopted by NYC will have as its number one priority the task of disposing of all of the City's daily residential trash flow. Whereas in the past this objective would have been considered sufficient in and of itself for determining the success of a long-term management plan, this is no longer the case. Modern solid waste disposal systems must dedicate substantial resources to the diversion of trash before it enters the waste stream through what is identified as an integrated waste management system. Popular understanding of this concept is known as the three “Rs:” reduce, reuse and recycle (EPA, 1995).

The United States Environmental Protection Agency promotes the diversion of trash through its hierarchy of integrated solid waste management. This pyramidal hierarchy places source reduction as the top priority, followed by recycling and finally, combustion and landfilling. In other words, communities should strive to reduce the amount of waste that is generated in the first place through source reduction. Whatever trash is produced should be recycled to the greatest possible extent. Any waste that cannot be mitigated or recycled would end up in landfills or incinerators (Eighmy & Kosson, 1996; EPA, 1999).¹

¹ There is great importance in reducing the amount of waste that is produced and enters disposal systems, especially when one considers that 213.9 million tons of municipal solid waste was generated in the United States in 2000 (EPA, 2002b).
Various forms of source reduction and recycling (in the two top tiers in the EPA's waste hierarchy), referred to here collectively as waste reduction, have become a popular means of preserving valuable landfill space for governments while providing consumers a chance to assuage their collective environmental consciousness. The impact of waste reduction initiatives toward diverting significant amounts from entering the trash stream has been considerable.

According to the best available data provided by the EPA, source reduction is responsible for diverting an estimated 55 million tons of waste - or 11 percent - of the nation's waste from entering the disposal system. The amount of waste that is being reduced is growing annually; in the last four years alone, the national source reduction rate has doubled (EPA, 1995; EPA, 2002b). It is defined as "any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they become municipal solid waste..." (EPA, 2002b, p. 106). Source reduction includes activities such as backyard composting, reducing unnecessary consumption patterns and replacing disposal items with reusable ones (EPA, 1995).²

Recycling, which is put into practice primarily through curbside collection, drop-off centers and state bottle-deposit programs, diverted an average of 30.1 percent of the nation's trash from immediate disposal in the year 2000 (EPA, 2002b).³ Like source

² Composting can be considered both as part of source reduction and recycling, depending on the type of composting activity that is conducted. When backyard composting is undertaken, it can be considered source reduction since yard and food (organic) waste is reused on site and never leaves its point of origin; it is diverted completely from the disposal system. On the other hand, when organic waste is picked up by a disposal system and composted at a dedicated facility, it is considered recycling (EPA, 1995).

³ Bottle-deposit programs are in place in eleven states: California, Connecticut, Delaware, Hawaii, Iowa, Maine, Massachusetts, Michigan, New York, Oregon and Vermont. The programs require a deposit at the
reduction, recycling is growing on an annual basis; nationally the recycling rate doubled in the 1990s (EPA, 2002a). Recycling is defined as “the process by which materials otherwise destined for disposal are collected, reprocessed, and remanufactured or reused…” (EPA, 1995, p. 6-1).

The recent relative success in waste reduction schemes has been not only good waste management practice, but also seems to have developed at the perfect time. The federal Resource Conservation and Recovery Act (RCRA), first passed in 1970 and subsequently amended on many occasions, strengthened environmental controls for landfills around the country. The result was that thousands of landfills that could not meet the new stringent requirements were forced to shut down. In 1970, there were an estimated 20,000 active landfills, but by 1995 only 2,800 were still open. Although this did not lead to reduced landfill space nationally, it did limit the options that communities had when finding a place to dump their trash (Eighmy & Kosson, 1996; Luton, 1996; Melosi, 2000; Rathje, 1999; Repa, 2000). In addition, the increase in the number of municipal recycling programs has been successful in diverting an increasing amount of waste from being immediately disposed, and in doing so has stretched the lifespan of many landfills.

4 In fact, although the United States leads the world in per capita and total amount of generated trash, it also leads the industrialized world in recycling. According to 1995 data on international recycling (the most current data that is available), the USA’s recycling rate is the highest, followed by Switzerland (23 percent) and Japan (20 percent) (EPA, 2002a).

5 Although the number of landfills has declined in the last few decades, the national capacity available has not diminished, due largely to the construction of so-called megafills – landfills that inhabit a huge area and cater to regional, rather than local customers. Nevertheless, the public’s perception of declining landfill space sparked what has been termed the “garbage crisis” (Melosi, 2000; Rathje, 1999; Repa, 2000).
Whether or not increased waste reduction is the result of a general public perception that a "garbage crisis" is hard to substantiate. However, the parallels that can be made from this national story to the recent travails of NYC's trash dilemma are noteworthy. Legislation, not over-capacity, was also the reason for Fresh Kills' demise (as with RCRA on the federal level). New York City as well now finds itself in the midst of a garbage crisis. An ingenious long-term management plan is obviously the first step toward solving the crisis. The question however remains: Will NYC make a commitment to waste reduction as part of that chosen long-term plan, or will it fail to follow in the footsteps of the national example? One thing is for sure though: The more waste that NYC reduces, the less waste it will have to dispose of; the less waste it has to dispose of, the greater the chances of success are for its long-term management plan. One way to ascertain the prospects of NYC instituting a forward-looking, proactive approach to waste management in the form of waste reduction is to review the programs that the City has implemented thus far.

5.2 NYC Waste Reduction Initiatives

The drive to minimize the amount of trash that is handled by the NYC DOS generally falls under three waste reduction categories: recycling, composting and waste prevention. Due to the increased costs of disposal incurred since the phase-down of the Fresh Kills landfill (as was illustrated in chapter 4), these strategies and their purpose have taken on greater saliency.
5.2.1 Recycling Program

The City of New York began its modern recycling program with a voluntary newspaper collection pilot in Manhattan in 1986. The promising results from this pilot program were the impetus for the establishment of a mandatory multi-material citywide program - Local Law 19 of 1989, The New York City Recycling Law. The law required that NYC achieve a 25 percent diversion rate by 1994. However, a gradual phase-in of curbside recycling meant that the program did not start servicing all of the DOS's customers until 1993. In addition to a lack of funding (due to budgetary conditions), this late start also led to the City’s failure to achieve the 25 percent recycling goal by 1994 (the actual 1994 recycling rate stood at nearly half that, at 12.8 percent). This, in turn, led to several state court injunctions that the City should allocate the necessary resources to achieve this goal (Clarke, 2001; Clarke, et al., 1999; CSWMP, 2000; DOS RI, 2001; NYC Recycling, 2001; Riggle, 1992).

As a result of the failure to meet its own recycling mandate, the City instructed the DOS to take measures to increase the citywide diversion rate. The steps taken to this effect included an expansion of the type of materials collected, creating a new market for recycled paper and increased collection frequencies (NYC Recycling, 2001; DOS RI, 2001). Consequently, the City was able to achieve a 20 percent recycling rate by 2000

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6 This modern recycling program was not the first time that NYC embarked on a campaign to recover its materials from the waste stream. A successful large scale recycling system was initially put in place at the end of the 19th century. This was discussed in greater detail in chapter 1.

7 The DOS's customers include all of the City's residents, city agencies and nonprofit institutions (NYC Recycling, 2001).

8 After increasing the type of materials accepted for collection, the DOS began collecting mixed paper, cardboard, as well as metal, glass and plastic (known as MGP). The new market created for mixed paper
and bill its recycling program as “the largest, most ambitious and comprehensive program of its type in the nation” (CSWMP, 2000, p. 23).

Although this 20 percent diversion rate still did not meet the City’s original goal of 25 percent recycling, it nevertheless was a source of pride for the DOS. The DOS even published a report in 2001 titled, New York City Recycling in Context, that compared the recycling rate of NYC against other major American cities’ recycling activities. The report detailed how, although NYC’s recycling rate did not match up favorably when compared to most other major cities’ rates, it nevertheless still outperformed them when all things were taken into account. It argued that when other cities’ recycling rates are compared to NYC’s, it is like comparing “apples to oranges.” For example, the report pointed out that while many cities include a combined recycling rate of both residential and commercial, NYC only counts residential (commercial rates are usually higher, and when combined with residential create the illusion of a high residential recycling rate). In addition, unlike most other cities, NYC has less compostable waste to divert (the presence of which leads to higher diversion numbers for other cities), has the highest population density of any city (which leads to decreased recycling) and does not count beverage containers that are returned for deposit (through the State’s Bottle Bill

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was the new Visy paper mill on Staten Island. Established through the involvement of the NYC Economic Development Corporation and the Mayor’s Office, the City contracted with Visy Paper Inc. to construct a $150 million recycling plant on Staten Island that would accept Manhattan and Staten Island’s mixed paper output and convert it to corrugated medium and manufacturing liner board. The Visy plant was billed as the biggest manufacturing development in the City in 50 years. This new market setup effectively insulated the City from the volatile market fluctuations of recycled paper commodity prices. The increased frequency of collection meant that all City residents had their recycling picked up at least once a week (CSWMP, 2000; DOS RI, 2001; NYC Recycling, 2001).
legislation) in its recycling rate.\textsuperscript{9} After taking all this into account, the report concludes that NYC may have the most impressive residential recycling rate of all cities in the country (NYC Recycling, 2001). Indeed, the hurdles that the City has overcome to achieve its level of recycling has led one observer of national recycling programs to remark that, "without a doubt, this is the most challenging program in the country, but it is also the most successful" (Biddle, 2001, p. 36).

Whatever the true picture was of NYC's recycling diversion rate, the price to achieve it proved to be too high for the City. At the start of his first year in office, Mayor Michael Bloomberg was faced with a City budget deficit of nearly $5 billion. As part of his planned budget cuts, Bloomberg announced that he would seek to reduce the scope of the recycling program to include only paper.\textsuperscript{10} Bloomberg argued that the metal, glass and plastic (MGP) portion of the recycling stream cost the City too much money and that many of the recyclables ended up in landfills anyway, the result of an inefficient system.\textsuperscript{11}

By mid-year, in June 2002, Bloomberg had reached a compromise with the City Council, which agreed to a temporary suspension of the plastic and glass portions of the recycling system. Starting July 1, plastic collection would be postponed for one year and glass would be postponed for two years, during which time the City would appoint a commission to determine how to improve the system. Paper and metals collection would

\textsuperscript{9} According to current New York State Law beverage containers diverted through the State’s bottle bill are not to be counted toward a jurisdiction’s official recycling rate (NYC Recycling, 2001).

\textsuperscript{10} As mentioned above, the paper portion of the recycling stream already had a dedicated market with the Visy mill, and no outstanding costs were therefore imposed on the City.

\textsuperscript{11} It is estimated that between 40 to 55 percent of targeted recyclable materials actually ended up in landfills or incinerators (Bradley, 2002; Clarke, 2001; IBO, 2002b).
continue to be collected on a weekly basis, as before.\textsuperscript{12} The contraction in type of materials collected would result in the City saving $40 million annually, while at the same time reducing the City’s recycling rate back to 12 percent (Bradley, 2002; Cardwell, 2002b; Cooper, 2002a; IBO, 2002b; Johnson, 2002b; NYC Recycling, 2001; NYT, 2002d; Press Releases, 2002; Residential Information, 2003).

At this point, the City is poised to resume the plastics portion of the recycling stream in July 2003, as was the City’s original goal. Much to the City’s fortune, a small scrap company in New Jersey has offered to pay for every ton of plastic and metal that the City sends it.\textsuperscript{13} This would result in the best recycling bid the City has received since the passage of Local Law 19 in 1989 (Cooper, 2003; Johnson, 2003; Schenkman, 2003). However, it remains to be seen if the City will successfully reintroduce the glass portion of the recycling stream by its deadline of July 2004.

\subsection*{5.2.2 Composting}

Although organic waste in NYC is not a significant portion of the waste stream (as mentioned above), it nevertheless accounts for a large amount of waste in absolute terms because of the immense size of the City. Recognizing this, the DOS began officially composting in 1990 when it diverted 1,000 tons of leaves from disposal at Fresh Kills to a

\textsuperscript{12} The Bloomberg administration agreed to the metals portion of the recycling stream to be continued because it is the most marketable material of the MGP stream (Cardwell, 2002a). However, proponents of recycling argued that suspending the system would confuse participants and actually be more expensive in the long run. They argued that the millions of dollars that the City had spent in preceding years on outreach would not only go to waste, but when the City would again resume full recycling, participation rates would falter from the perception that recycling was not really a priority for the City (Bradley, 2002).

\textsuperscript{13} This contrasts with all other recycling bids that the City had received. The small NJ company, Hugo Neu Corporation has offered the City $5.15 per ton of plastic and metal, while the next closest bid was from Waste Management, which offered to \textit{charge} the City $67 per ton (Johnson, 2003).
pilot composting project at the Edgemere landfill in Queens.\textsuperscript{14} By the year 2000, DOS was composting an average of 47,000 tons of organic material per year. This material came from collected neighborhood leaves, private landscaper yard waste, collected Christmas trees, material handled by City institutions and food waste from Riker’s Island (CSWMP, 2000; NYC Composting, 2001). These activities are described separately below.

The DOS designates a several week period each autumn for leaf and yard waste collection. During this publicized time period, the DOS advises residents to leave their organic waste in raked piles street side for easy pickup. The service is provided in 35 of the 59 Sanitation Districts that produce a significant amount of organic material. Each year, this fall collection is responsible for diverting 20,000 tons of organic waste from final disposal outside the City. This material is composted at a number of designated City compost sites, including the Fresh Kills compost facility on Staten Island, Soundview Park in the Bronx and Canarsie and Spring Creek Parks in Brooklyn (DOSAR, 2001; NYC Composting, 2001). Throughout the landscaping season, the DOS also accepts private landscaper waste for composting at the Fresh Kills facility. This accounts for approximately 7,000 tons per year of organic material (NYC Composting, 2001).

As with the yearly autumn leaf collection, DOS sets aside a publicized time frame each January in which residents are encouraged to discard their Christmas trees. Until 2003, this activity was responsible for collecting and composting 2,500 tons of organic material.

\textsuperscript{14} Although the compost program is formally designated as part of the recycling program (and is included in the recycling diversion rate) within the DOS Bureau of Waste Prevention, Reuse and Recycling, I nevertheless place the program under a separate heading in this chapter in order to highlight the special attention that the DOS has given to it.
material. Starting in 2003 however, Christmas trees would still be collected by the DOS, but would no longer be composted. Instead, they would end up being sent to out-of-state disposal facilities along with the rest of the City's trash. The program was cut due to the same budget constraints that forced a downsizing of the recycling program (DOSAR, 2001; NYC Composting, 2001; Scott, 2003).

Another way DOS has been successful in diverting organic waste from the disposal system has been to assist a variety of City institutions with on-site composting programs. For example, DOS has worked with the New York City Housing Authority (NYCHA) to cease leaving grass clippings for DOS pickup; instead, the clippings are left on the lawn. Outreach programs such as this one have helped NYCHA and other City institutions divert an average of 10,000 tons of yard waste from being disposed of each year (NYC Composting, 2001).

A separate, but interesting composting development with another City institution has also produced promising results. Since 1996, DOS has helped the prison system on Riker's Island conduct a program to compost its food waste. Since Riker's is the nation's largest municipal prison system with 17,000 inmates and 7,000 officers, it generates a significant amount of food waste - 20 tons per day. Food waste from the institution's kitchens, cafeterias and bakery are composted in a state-of-the-art in-vessel facility on the island. As a result, approximately 7,000 tons of food waste is removed from the DOS's disposal system each year. The compost product is used for a variety of applications on

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15 There is reason to believe that even if the program had not faced budget cuts, it still would have been eliminated. The DOS Annual Report for 2001 details how high contamination rates among discarded Christmas (plastic bags, tinsel, etc.) have made the resulting compost a low-grade quality. For this reason,
the island, including landscaping and beautification projects. The compost has also been used in City parks for restoration projects (CSWMP, 2000; NYC Composting, 2001).

In recent years, the DOS has been involved in a citywide compost outreach program called *The New York City Compost Project*. From its bases at each of the City’s four botanical gardens, the Compost Project has been responsible for educating City residents about the merits of composting. The Compost Project provided educational literature and workshops and sold discounted backyard and indoor compost bins. The Compost Project also hosted seasonal compost “giveback” events where City residents were encouraged to take free compost that had originated from DOS-collected organic material. The Compost Project was discontinued in July 2002 when funding was cut for the program concurrent with the budget cuts that affected the Christmas tree and recycling programs (Compost Project, 2003; DOSAR, 2001; NYC Composting, 2001).\(^\text{16}\)

### 5.2.3 Waste Prevention Programs

The City’s recycling and composting programs have been responsible for diverting trash from being disposed of at sites outside the City. Whatever the level of success one may attribute to these programs, it is evident that they have become a ubiquitous part of most New Yorkers’ consciousness. One program that has not had the same degree of public exposure, but is nevertheless potentially even more important for reducing waste, has been the DOS’s waste prevention initiatives. In recent years, the DOS has created a

\(^{16}\) It is apparent why the Compost Project was eliminated. According to a DOS study into the potential of backyard composting in NYC, any benefits that the City may reap from backyard composting would not have a noticeable affect on the overall diversion rate. This is due to the relative small portion of the waste
number of pilot programs that target both the residential and commercial waste streams with the goal of reducing the generation of waste at the source. From these pilot programs two services have sprouted that are different in approach, yet strive to accomplish the same goal of reducing trash.

The NYC Stuff Exchange is a toll-free telephone hotline that grew out of a pilot program on Staten Island and has been in service citywide since 2001.\(^\text{17}\) The automated service provides information about some 15,000 stores or organizations (such as thrift shops) in the City that repair, buy, sell or accept goods for reuse. The hotline is aimed at individuals and businesses that would either like to donate or sell their goods or buy used goods. Thus, the NYC Stuff Exchange acts as a locator service for parties interested in used goods and prevents additional items from entering the trash stream. It has been estimated that the hotline prevents nearly 5,000 tons of trash from being disposed of each year (DOSAR, 2001; SAICa, 2000).\(^\text{18}\)

New York City WasteLe$$ is a waste prevention program that began as a pilot directed at businesses and institutions. Although the program still provides technical assistance to organizations interested in reducing their waste output, the program has expanded to address the activities of individuals. New York City WasteLe$$ provides an educational and informative website for consumers to browse.\(^\text{19}\) The website “contains stream that is composed of organic material in NYC, as well as the small number of people likely to practice composting (BioCycle, 1999; MacBride, 2000).

\(^{17}\) The NYC Stuff Exchange telephone number is 1-877-NYCSTUFF.

\(^{18}\) Besides diverting many tons from disposal, the hotline enables consumers to not be forced to purchase new goods, thus saving (the environment, as well as) them money. The amount of money saved by consumers as a result of the service is estimated at $49 million a year (SAICa, 2000).
practical ideas for how New Yorkers can prevent waste at home, work, and school, and when shopping” (DOSAR, 2001, p. 26). Unlike NYC Stuff Exchange, it is impossible to determine how much waste is actually diverted as a result of the NYC WasteLe$$’s educational efforts. However, NYC WasteLe$$ differs from NYC Stuff Exchange in that it provides intangible advice, whereas the latter provides an outlet for material goods (CSWMP, 2000; DOSAR, 2001; NYC WasteLe$$, 2003; SAICa, 2000).

Although not begun as a pilot program along with these other two initiatives, the Materials for the Arts (MFTA) program is the DOS’s original waste prevention program, and was started in the 1970s. The MFTA is a service that accepts donations and makes them available to artists, art programs, organizations, schools, government agencies and schools. The MFTA utilizes a large warehouse in Long Island City (Queens) and is funded through the DOS and Department of Cultural Affairs. While providing a beneficial service to many in the City, the program also has diverted approximately 50 tons of waste from disposal per year (CSWMP, 2000; DOSAR, 2001; SAICa, 2000).

Waste prevention programs that have been utilized in the past by the DOS but are no longer being used have been the NY CitySen$:e program and the Direct Mail Reduction program. The NY CitySen$:e program was an outgrowth of two mayoral directives on waste prevention issued in the 1990s. The program concluded in 2000 and

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19 The NYC WasteLe$$ website was launched in December 2001, is run by the DOS, and is located at http://www.nycwasteless.com.

20 The DOS has established a service similar to NYC Stuff Exchange but is targeted at businesses. It is called NY Wa$:eMatch and acts as a brokering service between businesses and organizations and deals with non-hazardous industrial products and surplus inventories. In 2001, NY Wa$:eMatch was responsible for diverting 3,400 tons from the waste stream (DOSAR, 2001; NY Wa$:eMatch, 2003). While this is a commendable achievement and provides a valuable service to NYC's business community, it is unclear why DOS has invested in the program, as it does not handle the commercial waste stream and would therefore not readily obtain any benefits from their efforts.
recommended waste reduction plans, held waste prevention seminars, and advised environmentally preferable procurement strategies for several mayoral agencies. Twice during the 1990s, the Direct Mail Reduction program provided pre-addressed postcards to the Direct Marketing Association for residents to use in order to diminish the amount of unwanted mail they received (CSWMP, 2000; DOSAR, 2000; SAICa, 2000).

A peculiar postscript to the waste reduction strategies of the DOS has been the lifting of the ban on in-sink food waste disposals (commonly referred to as garbage grinders or simply disposals). The installation and use of disposals had been illegal in NYC since its invention because it was thought that the City’s antiquated sewage system would not be able to handle the additional suspended solids of food waste. After the NYC Department of Environmental Protection released a study in the 1990s recommending the use of disposals, the City Council lifted the ban. While the disposal legislation was not the initiative of the DOS, it estimates that within 40 years as much as 3 percent of the City’s residential waste stream could be diverted as use of disposals grows more prevalent. While 3 percent may not sound like much, it is equal to 87,580 tons of waste per year and could save the City $4.5 million annually (CSWMP, 2000; NYC Composting, 2001).\(^{21}\)

\(^{21}\) This number takes into account the added financial and physical burden that would be placed on the City’s wastewater treatment plants, which would experience increased loads as a result of the disposal ban legislation.
5.3 NYC Waste Reduction Scorecard

This chapter has shown how, on a national scale, source reduction is responsible for preventing 11 percent of waste from being generated, while recycling is responsible for diverting 30 percent of waste from the nation's landfills and incinerators. This chapter has also shown that while efforts have been made in NYC to reduce waste, those efforts have not always been successful. The current state of waste reduction activities in NYC is poor. The recycling system has been cut and now diverts only about 12 percent of waste, the composting program does not have the potential to divert much and has subsequently also been downsized, and waste prevention programs have not begun to make a dent in the City's trash stream. The waste reduction programs of NYC are not performing well when considered by themselves and especially not well when compared to trends that are occurring in the rest of the nation. A new approach to waste reduction is needed in NYC that will divert a considerable portion of the trash stream, while at the same time complementing its new long-term solid waste management plan. The next chapter discusses a range of innovative waste reduction strategies and determines which one is most likely to provide the best answer for NYC's waste reduction dilemma.
CHAPTER 6

INNOVATIVE WASTE REDUCTION STRATEGIES AND THEIR APPLICABILITY TO NYC

The previous chapter provided an overview of the current state of activities practiced by the DOS to reduce the amount of waste generated by NYC’s residents. New York City currently does not appear to have the institutional programs necessary to see a marked improvement in its waste reduction rates. If past performance is indicative of future results, then the potential to achieve a significant decline in the amount of material that enters the solid waste stream in NYC is poor. Even if the City re-implements its recycling program in the future and attains the elusive 25 percent diversion rate, the City would still need to establish a program to encourage New Yorkers to decrease the amount of waste produced in the first place. Recycling is a prerequisite for, and also a natural complement to, any source reduction initiative. Therefore, any waste reduction agenda implemented in tandem with the City’s new waste management plan must depart from the practices of the past and embrace fresh ideas and innovative strategies. This balanced approach has the promise of not only granting NYC a workable trash policy, but would also make it a national leader in municipal waste management.

6.1 Innovative Waste Reduction Strategies

In formulating these fresh and innovative approaches, NYC does not have to start from scratch. Many options to control the generation of trash are available to policymakers at the DOS. Two methods in particular may provide the necessary means for NYC to carry out a successful waste reduction program. These methods include strategies known as
pay-as-you-throw and extended producer responsibility. Pay-as-you-throw (PAYT) is a concept that relies on financial incentives to encourage consumers to reduce the amount trash that they discard. Extended producer responsibility places the burden of disposal at the hands of the original producer. Finally, in addition to initiatives that may originate in the administrative circles of the DOS, grassroots schemes may also provide some insight into methods for NYC to innovatively reduce its waste. A discussion of the details of these concepts and how they might apply to NYC follows.

6.1.1 Pay-As-You-Throw

Pay-As-You-Throw programs are growing in popularity among governmental waste management entities looking for ways to stem the amount of trash generated by residents. Also known by such names as variable-rate or unit-based pricing, quantity-based user fees, or residential waste fees, PAYT has been successful in encouraging residents to reduce the amount of trash they dispose of into the nation’s landfills and incinerators. The incentive that PAYT uses to entice residents to reduce the amount of trash they throw away is not like the feel-good tactic often employed by recycling programs, but rather relies upon the more effective technique of financial persuasion. In most waste disposal systems in America, trash is collected curbside regardless of the amount of garbage generated. In these systems, the sanitation budgets of local government are usually derived from property taxes. Thus, the regular pickup of trash from the curb is often viewed as a “free” service provided by the local authority. The premise behind PAYT is that it ends this allusion of free trash pickup by imposing a direct fee upon the generator (resident) for the amount of trash discarded.¹ In this respect, it charges for a

¹ Depending on the type of PAYT program instituted, fees may be based on either volume or weight.

For any PAYT system to be viable, a comprehensive recycling program must exist or be established. This is because while PAYT charges residents for the amount of trash disposed of in the waste stream, it provides unlimited recycling services free of charge. Thus, the more that one recycles, the less that is thrown away, and the less one pays in disposal fees.\(^2\) This provides an effective incentive for residents to not only recycle more, but also reduce to the amount of trash generated from the start.

Pay-As-You-Throw programs may differ slightly from one another and the characteristics of a given municipal program may reflect the desires and needs present in that particular community. As a result, programs adhering to the PAYT principle use such differing methods as cans, bags, tags/stickers, hybrid systems or weight-based approaches. The cans system utilizes different-sized municipally-issued cans and the customer is charged a monthly fee based on the size of the can. The larger the can, the higher the monthly fee charged to the resident. The bags system works much the same way as the cans system, except that it uses different-sized municipally-issued plastic bags. The tags or stickers program is also similar to the two previous versions discussed, except that it utilizes an officially issued sticker or tag that is placed on a regular plastic bag.\(^3\) A hybrid system provides a limited amount of collection service to residents. In this method, residents can only throw away a limited amount of trash within a given time

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\(^2\) It is uncommon for a recycling program to be self-sufficient, and most residential recycling programs do indeed involve a net cost for sanitation entities. However, the pricing structure of PAYT programs are generally set up to make recycling appear “free,” while it is ultimately being paid for by the disposal fees (Canterbury, 1998; Miranda & Aldy, 1998).

\(^3\) In this system, different tags are usually sold at variable prices, depending on the size of the trash bag that is to be used,
period. The weight-based system is the only method that charges users based on weight and not volume (HEC, 2002; Padgett, 2002).

Besides accomplishing the very important goal of reducing the amount of trash entering the waste stream, PAYT is viewed as a progressive step forward in solid waste management. The U.S. EPA and waste management administrators cite the improvement of the environmental, economic and equitable performance of a disposal system as examples of PAYT’s promise. Environmentally, PAYT has been proven to reduce the amount of waste generated and also substantially increases recycling diversion rates. Economically, PAYT is an effective tool to combat rising disposal costs and also gives residents greater control over the amount they are charged for trash disposal. Pay-As-You-Throw is also a fair and equitable system. Residents only pay for what they toss away. This contrasts to other systems in which residents who recycle more may subsidize the wastefulness of their non-recycling fellow residents. Pay-As-You-Throw ends a system that encourages free riders (Canterbury, 1997; DiMartino, 2000; EPA PAYT, 2003).

Communities that participate in PAYT programs have reduced their generated waste on average from 14 to 27 percent, an amount equal to 1.3 million tons nationally per year. In addition, these communities have at the same time increased recycling rates on average from 32 to 59 percent (Canterbury, 1998; DiMartino, 2000; Hui, 1999; PAYT Bulletin, 2003).

It is interesting to note that households in PAYT communities have been found to modify their waste reduction behavior in two stages over time. The first stage consists of diverting significantly more recycling and yard waste than had previously been the case. By the second stage, residents have attained their maximum diversion rate through recycling and therefore begin to source reduce (i.e. buying products with less packaging, etc) (Miranda & Aldy, 1998).
The results experienced from implementing a PAYT program are not a mere anomaly, nor is the system an experimental trend that lacks reproducible results. According to the EPA, 5,245 cities across the nation are currently participating in some form of PAYT. Included in this number are more than 60 cities that have populations greater than 100,000 (PAYT Bulletin, 2002). This adds up to approximately 20 percent of the U.S. population being served by PAYT. Pay-As-You-Throw programs have been implemented in all but four of the 50 states (PAYT Bulletin, 2003).

The success of PAYT, evidenced by the proliferation of programs across the country, has led the EPA to formally endorse the method as a preferred way to organize a municipal collection system (DiMartino, 2000; EPA PAYT, 2003; Hui, 1999). Although the support that the EPA provides to communities interested in PAYT does not go much beyond providing encouragement and information, a number of states have emerged as pioneers in promoting PAYT programs within their borders. These states include Iowa, Massachusetts, Minnesota, Washington and Wisconsin, who provide assistance to communities in the form of mandates or grants. In particular, Massachusetts has embarked on an aggressive program to encourage the adoption of PAYT in towns throughout the state. The state provides grants, certification programs and technical assistance to municipalities that implement PAYT programs (Canterbury, 1998; Horton, 1999; Hui, 1999).

In the face of these developments, NYC has become interested in PAYT. In the past, the City’s Office of Management and Budget (OMB) studied the feasibility of instituting PAYT. However, NYC at that time concluded that PAYT would not work due
More recently, with the increased cost of hauling waste out of state and the shrinking municipal budget, the City has once again revisited the idea of initiating PAYT. In the Message of the Mayor in NYC’s Executive Budget for fiscal year 2003, Mayor Bloomberg mentioned PAYT as a possible tool to alleviate the City’s trash problems. In addition, at around the same time, NYC’s Independent Budget Office (IBO) proposed PAYT as an option to save the City money. Specifically, the IBO estimated that the City would see a 14 percent reduction in waste and would save approximately $212 million annually if a PAYT program were initiated citywide (IBO, 2002a; OMB, 2002).

As noted earlier, well over 5,000 cities across the U.S. have adopted PAYT as their guiding waste management policy. Out of this number, only about 60 cities have populations of 100,000 or more. Pay-As-You-Throw has obviously had greater success in attracting the attention of smaller communities. Some of the obstacles that large cities face when attempting to implement PAYT includes making it work in multi-tenant buildings, not overburdening low-income households, and operating collection and payment systems (PAYT Bulletin, 2003).

New York City will face all of three of these issues if it should decide to implement PAYT. Proposed solutions to these problems include, respectively, providing

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5 Cities such as NYC have a more difficult task trying to implement PAYT. This is due to the abundance of apartment buildings and other multi-family residences in such cities. In these buildings, trash is usually collected in a communal container and it is impossible to distinguish one person’s trash from another. Therefore, it would be rather difficult to charge each unit for garbage removal based on volume or weight.

6 The Independent Budget Office of NYC is a publicly funded agency that provides non-partisan policy, budgetary and economic analyses for the City. The IBO acts as a financial assessment consultant to different City agencies and the City Council (IBO website, 2003).

7 Some of the larger cities using some form of PAYT are Los Angeles, San Francisco, Seattle, San Jose, Austin, Portland and Buffalo (Hammer, 2002; HEC, 2002; NYC Recycling, 2001; Rathje, 1999; PAYT Bulletin, 2003).
incentives to building managers to encourage their residents to fully participate in the PAYT program, providing a lower rate structure for low-income households and tying disposal fees to monthly water bills (HEC, 2002).

Although there are technical problems for implementing PAYT in a large urban area such as NYC, the obstacles are not necessarily insurmountable. The environmental and economic benefits that could be had if a well-planned PAYT program were implemented in NYC are so large that they may well outweigh the hurdles that stand in their way.

6.1.2 Extended Producer Responsibility

Extended Producer Responsibility is a concept that originated in Germany with its Packaging Ordinance of 1991. The effect of this law was to shift the burden of packaging waste disposal from the governmental sector to private industry. Extended Producer Responsibility has become to be employed as a broad term to that is used to encompass many waste mitigation measures known as Product Stewardship, Take-Back, and varying forms of packaging restrictions. Extended Producer Responsibility functions as a mechanism to encourage the closed-loop use of materials; it also acts as an incentive

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8 Proposals such as these may provide the answers that NYC needs to implement a successful PAYT program. Other options include cutting off DOS service completely to multi-unit residences and contracting out with private waste haulers (as is done in other large cities where PAYT has been implemented) (Tierney, 2002). However, this proposal would negate the mission of the DOS, which is to provide trash collection for all of NYC's residents, and end up serving approximately only 40 percent of the City's residents (PAYT Bulletin, 2003).

9 The German Packaging Ordinance was the catalyst for the so-called "Green Dot" program run by an industry-created nonprofit company, Duales System Deutschland (DSD). DSD is in charge of recycling and disposing of all material included in the Green Dot system. Since the introduction of the Green Dot program, product packaging has decreased, while recycling has seen a parallel increase. Packaging was the initial target of this EPR system since it accounts for approximately one-third of all generated waste in Germany (as it does in the U.S.). It is also interesting to note that the decrease of national landfill capacity was the main impetus behind the Packaging Ordinance (Fishbein, 1996, 1998; Gandy, 1994).
to prevent the initial production of superfluous materials in products. Extended Producer Responsibility places the responsibility for the post-consumer stage of a product on the original producer.\(^1^0\) This scheme effectively transfers the cost of waste disposal for these items from the public arena to producers. Thus, the cost of a product (for consumers) will reflect its total cost, including not only the production cost, but also the disposal cost (Cardinali, 2001; Fishbein, 1996, 1998; Fishbein, Ehrenfeld & Young, 2000).

The concept of EPR has since taken root well beyond Germany, and has been adopted by the European Union (EU) as well as Japan (Fishbein, 1996; Houston Chronicle, 2001). This same level of enthusiasm has not been displayed by the United States regarding EPR. In fact, the U.S. is the only industrialized country that does not have a national policy on EPR (Fishbein et al, 2000).\(^1^1\) This may be due to the history in the US of traditionally deferring to local authorities in matters of solid waste (Melosi, 2000).

Despite the failure of the federal government to devise legislation adopting EPR, two major developments have occurred over the past 30 years at the state level promoting EPR-style initiatives. Beginning with Oregon in 1971, eleven states (including New York) - accounting for 30 percent of the national population - have created container-

\(^{10}\) By placing the overall responsibility (especially financial) for the ultimate disposal or recycling of products with the manufacturers, EPR not only provides an incentive for companies to reduce the amount of material used in the manufacture of a given product, but also encourages them to redesign the product itself to include less hazardous or toxic substances and other materials that are not easily recycled.

\(^{11}\) As opposed to the accepted understanding of the meaning of the term, the U.S. has shown interest in its own version of EPR, which it defines as extended *product* responsibility. Under the Clinton administration's President's Council on Sustainable Development (PCSD), extended product responsibility meant that "lasting and substantial environmental improvements in product systems can only occur with the combined expertise, ingenuity, cooperation, and commitment of all the actors in the supply chain..." (EPA, 1998, p. 1). In other words, the EPA chose to lay responsibility for the overall environmental performance of a product at the feet of all interested parties – from the raw materials suppliers, to the consumer. Despite this clarification of meaning, there exists no federal legislation to promote extended product responsibility (Fishbein, 1998).
deposit legislation that imposes a small levy on certain beverage containers that can be
redeemed upon return of the container (CRI, 2003). The beverage producer then has
final responsibility for disposing or recycling the returned bottles. In New York State,
which started its “bottle bill” program in 1983, this has translated into a redemption rate
of 70-80 percent and a 75 percent decrease in litter (NYSDEC, 2003). The number of
containers diverted through this type of legislation equals approximately 1.5 percent of
all residential material that enters the waste stream in NYC (NYC Recycling, 2001).

The second major development of EPR that has developed as the result of state
level action has been the establishment of the Rechargeable Battery Recycling
Corporation (RBRC). The RBRC was created in 1995 by the battery industry in response
to legislation by 13 states imposing special regulations on nickel-cadmium (Ni-Cd)
batteries. The RBRC is an industry-run voluntary national program that collects and
recycles post-consumer Ni-Cd batteries, and therefore prevents a significant amount of
toxic materials from entering the country’s landfills and incinerators. RBRC estimates
that it is recovering and recycling 80 percent of all Ni-Cd batteries used in the country
(Fishbein, 1998; Fishbein et al, 2000).

Although the state bottle bills and the RBRC divert a relatively small amount
solid waste from entering the nation’s disposal sites, they nevertheless are testament to

12 Greater detail about the eleven states is discussed in chapter 5.

13 The 70-80 percent redemption rate for beverage containers in New York State contrasts with the 26
percent recycling rate of beverage containers in states that do not have container-deposit legislation
(Fishbein et al, 2000).

14 RBRC collects Ni-Cd batteries from drop-off bins located in many electronics and drug stores.

15 In being an industry-run program, the RBRC is very much like Germany’s DSD. However, RBRC was
created in response to state-level legislation, and not federal legislation, as was the case in Germany.
the notion that certain types of EPR programs can be instituted in the U.S. What then, are the prospects for establishing an EPR program in NYC? Since the RBRC operation already exists nationally - including NYC - two other options remain.\textsuperscript{16} These options include legislating packaging restrictions for items sold in NYC and expanding the existing New York State bottle bill.

Although packaging regulations have primarily been enacted on the national and supranational (European Union) level, the option exists for NYC to contrive its own rules governing packaging. In fact, existing statutes within the New York State Tax Code provide the City with the authority to impose additional taxes on packaging.\textsuperscript{17} This could possibly be used to effectively reduce the amount of packaging consumed in the City (CWMI, 1998; SAICb, 2000). If NYC would proceed with an agenda to regulate packaging waste within its borders, it would be a pioneer among municipalities. The first known case of a municipality imposing such a waste tax occurred in the city of Kassel in Germany in the early 1990s. However, after a protracted legal battle testing the tax’s legality, Germany’s constitutional court ruled that municipalities are barred from imposing such rules, since they contravene the federal government’s Packaging Ordinance of 1991 (Financial Times, 1998; Kinzer, 1994; Pehle, 1997).\textsuperscript{18} Fishbein et al. (2000) suggest that such lawsuits are the reason that EPR has not been more successful in

\textsuperscript{16} Besides being a voluntary program run by industry, the RBRC targets a specific product. Therefore, other options must be explored that would allow NYC to divert a greater variety number of materials from entering the waste stream.

\textsuperscript{17} This is found in Article 29 Section 1201 (f)(1) of the New York State Tax Code (CWMI, 1998; SAICb, 2000).

\textsuperscript{18} This ruling occurred in 1998, by which time about 40 German towns had adopted measures similar to the ones existing in Kassel. The ruling was expected to affect all of these municipalities, causing a serious blow to packaging restrictions in Germany (Financial Times, 1998).
the U.S., while another study proposes that any restrictions adopted by NYC would have minimal affect on packaging; rather their greatest contribution would be to build support for similar initiatives at the federal level (CWMI, 1998). In other words, even a governmental entity with such political clout, national influence and consumer purchasing power such as NYC may not be able to tackle EPR in the realm of packaging regulations. On the other hand, the more successful route may be through the state government.

The state government has jurisdiction over the bottle bill, including any modifications to the law. An expansion to the scope of the existing bottle bill would help divert additional trash from the City’s waste stream. Such an expansion could incorporate beverage containers (or other packaging materials) currently not covered under the law, including wine, liquor and other containers. According to a study commissioned by the DOS, such an expansion would divert an additional 200,000 tons of waste each year, thereby saving the City $9 million annually (SAICb, 2000). However, even accounting for the total number of beverage containers that would be diverted after the adoption of an expanded bottle bill, the percentage of waste being diverted through this method would only account for a slight percentage of the entire NYC waste stream.

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19 Interestingly, an effort to establish a national beverage container deposit system has begun. In July 2002, Senator James M. Jeffords, a Vermont Independent, introduced legislation in Congress that would place a 10-cent deposit on nearly all beverage cans and bottles sold in the country. The legislation was introduced in the face of declining rates for recycling, due to the increased consumption of beverages outside the home (such as sport drink bottles, soft drink containers and bottled water). The fate of the legislation is currently in doubt as a result of the November 2002 elections that returned control the Senate to the Republicans, and subsequently removed Mr. Jeffords from his influential post as the Chairman of the Senate Committee on Environment and Public Works (Winter, 2002).
6.1.3 Grassroots Efforts

The previous two strategies discussed, PAYT and EPR, both rely on government intervention in the form of legislation and enforcement to reduce the amount of generated waste. Another method to reduce the amount of material entering the NYC waste stream does not require the DOS to be actively involved, but has the potential to divert as much, if not more trash than PAYT or EPR. So-called grassroots programs encourage consumers to adopt environmentally friendly lifestyles, usually through public outreach campaigns. These programs promote tempered consumption patterns through more efficient use of resources such as water and energy, and subsequently the reduction of household solid waste (Hobson, 2001).

Two non-profit organizations that have been involved in this type of grassroots activity are the Empowerment Institute (EI) and the Center for a New American Dream (CNAD).\(^{20}\) EI has devised an activist network known as the EcoTeam Program (ETP). The ETP assists in bringing together five or six households in a neighborhood (called an “EcoTeam”) for a four-month period to learn how to live a more environmentally sustainable lifestyle. The households choose a progression of realistic actions to undertake together and reinforce each other’s commitment to their common cause. As a result, EI claims that, depending on the community, EcoTeams have been able to reduce their average household trash outflow by 41 to 51 percent.\(^{21}\) For instance, an EcoTeam

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\(^{20}\) EI is an NGO that provides clients with consulting services designed to address issues of community participation. Its stated mission is to “empower the human dimension of community and environmental change” (EI, 2003).

\(^{21}\) CNAD is a uniquely and narrowly focused environmental NGO that focuses on addressing the consumption patterns of Americans. The mission statement of CNAD is that it “helps Americans consume responsibly to protect the environment, enhance quality of life and promote social justice” (CNAD, 2003).
from the City of Bend, Oregon was exceptionally successful reducing its generated waste by 60.2 percent (EI, 2003).

The CNAD has also established an activist network similar to ETP. Called Turn the Tide (TTT), it also encourages consumers to undertake a slightly less demanding routine toward an environmentally friendly lifestyle. Turn the Tide is a program that advocates the adoption of “nine actions” to tread more lightly on the global environment. Most of the actions focus on resource or energy conservation measures. However, one of the steps simply asks participants to fill out a form to decrease the amount of unwanted (“junk”) mail they receive (CNAD, 2003). This is very similar to the junk mail reduction program that the DOS had promoted in years past (discussed in the previous chapter).

Although these two grassroots programs are representative of what is possible without the intervention of the DOS, their voluntary nature raises doubt the effectiveness of the efforts. In other words, large-scale public adoption of such schemes may not be realistic. As Hobson (2001, p. 192) points out, “research suggests that it is not effective in promoting the public uptake of sustainable lifestyles.”

### 6.2 Best Waste Reduction Option

This chapter has examined salient waste reduction innovations that could compliment NYC’s newly adopted solid waste management plan. Pay-As-You-Throw, EPR and the grassroots efforts provide a glimpse into the potential waste reduction benefits that NYC could reap. The two strategies likely under an EPR scenario, packaging restrictions and

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21 Regarding other accomplishments, IE states that EcoTeams have been able to save 25-34 percent of water usage, 9-17 percent of energy consumption, 16-20 percent of fuel for transportation, as well as saving households $227-$389 per year. According to EI, 40,000 people worldwide have taken part in an EcoTeam, and there are currently EcoTeams in more than 40 U.S. cities (EI, 2003).
an expanded bottle bill, may not provide a solution for NYC. Although the legal framework exists for its implementation, packaging restrictions have not been instituted on a large-scale municipal stage such as NYC. Additionally, the fear of legal counteraction by industry may make the adoption of such restrictions unlikely. The expansion of the state-level bottle bill, while most probably less problematic from an initiation standpoint, will not in and of itself provide the waste diversion benefits that are needed. The grassroots efforts by organizations like IE and CNAD are vehicles for individuals who are actively looking for an opportunity to live a more sustainable lifestyle, but do not offer the guaranteed consistent and large scale results that NYC should rely on.

In conclusion, PAYT appears to be the only method that will be able to entice the individual consumers of NYC to minimize the amount of trash that they place at the curb. Because financial benefits are directly related to the amount of material that does not enter the waste stream, PAYT has proven to be the waste management and reduction method of choice for over 5,000 U.S. towns. Although obstacles need to be addressed to make the system work in the nation's most populous city, PAYT appears to be the City's best chance to substantially reduce the amount of materials that enter its waste stream. After instituting the City's existing source reduction programs, as well as a reinvigorated recycling program (able to meet the City-mandated 25 percent diversion rate), PAYT can add the final piece to the waste management and planning puzzle in NYC to create a world-class sanitation system.
CHAPTER 7
CONCLUSION: THE POLITICS OF A NEW COMPREHENSIVE MSW MANAGEMENT PLAN IN NEW YORK CITY

The current “waste crisis” in which NYC currently finds itself is not a consequence of uncontrollable or unforeseeable obstacles. Rather, the inability of the City to implement a rational solid waste management scheme has come about through years of handicapped sanitation planning. Although the scope of the waste crisis is definitely unique to NYC because of the City’s size, the story is familiar. As the United States enters the 21st century, its large cities are no longer able to completely manage their waste streams within their geographic borders. Siting new waste management facilities has been difficult, if not impossible within a dense urban center.

7.1 Lessons from Other Cities
Chapter 2 provided insight into the status of trash management in three other major American cities. The stories of Los Angeles, Phoenix and Seattle all attest that the situation that NYC now faces is not unique, and that given the right planning foresight, a solution can be formulated. Like NYC’s experience with Fresh Kills, all three of these cities are currently, or have in the past, relinquished control of in-city landfill capacity. As a result of their sagaciousness, all three cities presently do, or plan to, utilize out-of-city (and even out-of-state) disposal options as a final resting place for their citizens’ trash.

As the second most populous city in the country after NYC, Los Angeles is a good comparison in garbage management. Los Angeles’ long-term strategy for
managing its waste is to increase recycling diversion rates while relying on a distant “megafill” in the desert for final disposal (which would be reached by rail). Phoenix, itself located in the desert, had the fortune of siting a new landfill in the surrounding vacant hinterland. Seattle devised the most comprehensive strategy of all by introducing source reduction and recycling concurrently through a PAYT rate structure, and by shipping the remaining waste via rail to an out-of-state landfill.

7.2 Political Feasibility

The scenarios portrayed by the three cities discussed above provide valuable experience for NYC’s own future waste plans. These lessons seem to insinuate that out-of-city disposal is inevitable and that a cost effective and reliable system that minimizes the size of the waste stream must be established to assure New Yorkers a dependable waste disposal system for years to come. This is obviously easier said than accomplished. The eleven alternative plans discussed in Chapter 3 provide options that have been developed by a wide variety of interests from various quarters of NYC’s idiosyncratic political landscape. The plans were ranked in Chapter 4 according to financial, technical, administrative and environmental considerations. Therefore the top ranked plans represent the best options available to the DOS. However, one criterion that was not used to scrutinize the eleven plans was their political feasibility. In other words, what is the relative acceptability of each plan when subjected to the contentious political climate that exists in NYC?

1 The four top-ranked alternative plans from Chapter 4 are, in order: Reopen Fresh Kills, Columbia University Plan, Bloomberg Incineration and Comptroller Report. In the discussion that follows, the Bloomberg Incineration option has been omitted because of its similarity to the Columbia University Plan and the lack of comprehensive details available about the plan.
7.2.1 Three Plans Minus One

Instead of judging each one of the 11 plans again, it is prudent to appraise only the top-ranked alternatives. The three plans that are ranked highest are (in descending order) Reopening Fresh Kills, the Columbia University Plan, and the Comptroller Report. While the first two plans listed merit further consideration, the Comptroller Report must be disregarded from further comparison. This is because the report encourages the adoption of a solid waste plan that is centered on the collection, as well as the short and long haul transport aspects, of waste management. The plan does not prescribe a specific disposal method and therefore cannot be considered a true comprehensive management plan. However, the other two plans do provide full schemes for dealing with the City’s trash from pickup to disposal.

7.3 Political Considerations

Reopening Fresh Kills and the Columbia Plan vastly diverge in their approach for managing the City’s waste. Sending NYC’s residential garbage to the Staten Island landfill would resurrect the full control that the DOS previously had over the trash stream, would not require much (if any) capital investment, and could be implemented virtually instantly. The Columbia Plan, on the other hand, may require the City to contract with WTE operators, would require extensive funding, and would take years to get running. From this point of view, once again using Fresh Kills seems like the logical solution. However, delving deeper into other forces that come into play when considering each of these plans will reveal which plan is more likely to triumph when
removed from the vacuum of academic exercise and placed in the quagmire of NYC politics.

7.3.1 Reopen Fresh Kills

The Fresh Kills landfill was closed as part of an agreement reached between then NYC mayor Rudolph Giuliani and Governor George Pataki. The closure of Fresh Kills was codified into state law shortly thereafter in Chapter 107 of the Laws of 1996 (NYS SWMP, 2000). Although the closure of the landfill was intended to be permanent, the facility was reopened immediately after the September 11, 2001 terrorist attack on the World Trade Center. Governor Pataki invoked his emergency powers in the midst of crisis to provide a site for the rescue, recovery, salvage and investigative efforts following the attack. As unfortunate as this example is, it nevertheless exhibits the power that the governor has to reopen Fresh Kills (Benjamin Miller, personal communication, February 24, 2003). Ostensibly, the governor could consider the current financial situation of NYC as an emergency worthy of measures such as reopening Fresh Kills as budgetary relief for the City.

Given that the legal precedent exists for reopening the City’s last landfill, widespread opposition still exists among Staten Island’s residents to such a move (discussed in Chapter 1). As the borough with the smallest population, the island has the least political clout in city government and this is partly responsible for Fresh Kills’ continued use for over 50 years. The inevitable opposition that a decision to reopen the landfill would elicit would probably not be great enough to resist the will of the rest of the City and the Governor. However, two conditions exist at Fresh Kills - one physical
and one transcendental - that are sure to prevent the imposition of such a unilateral decision.

The physical condition at Fresh Kills is the limited remaining capacity in the landfill. According to the most liberal estimates, reopening Fresh Kills would only provide the City with a few decades' worth of dumping room (Blood, 2002; IBO, 2001; Miller, 2000). While this may sound like a long time horizon, any increase in the volume of trash disposed by NYC citizens (as has been the trend for the last few decades) would significantly reduce the life expectancy of the landfill. In addition, as soon as capacity is reached at the landfill, then it would be undeniably closed forever. At this point, the City would once again have to seek a wholly new waste management plan. Fresh Kills' capacity is not easily predictable and would fluctuate with the amount of trash the City disposed of over its useful lifetime. The longer the ability of a plan to accommodate the City's wastes, the better that plan is.

The transcendental condition at Fresh Kills is that after the World Trade Center (WTC) terrorist attack, the landfill was transformed from a stark dumping ground for the City's trash to hallowed ground. As the final burial place for much of the WTC's wreckage, as well as for the remains of scores of missing victims, the Fresh Kills landfill has now taken on immeasurable significance in the American public mind, and especially for the families of the victims (Emling, 2003; Gittrich, 2002). The once universally reviled ground is now holy, spiritual and sacrosanct. No amount of political arm-twisting and deal making would be able to reopen the landfill.² It has become untouchable, a corner of the City that will eternally remain at rest.

² Others would argue that the Fresh Kills landfill is made up of multiple and separate hills, and since the WTC investigation took place on top of only one of those hills, a barrier could be constructed around the
7.3.2 Columbia University Plan

Although the elimination of the Comptroller Report and Reopening Fresh Kills as waste management options would appear to frame the Columbia Plan as the default “winner,” the Columbia Plan is able to stand on its own merits as a worthy alternative. The Columbia Plan suggests utilizing a modern MRF to recycle 40 percent of the City’s recyclables, while sending the remaining trash to advanced WTE facilities. Despite the recognized improvement in environmental performance of WTE plants in recent years, the probability of siting multiple WTE facilities within the City’s boundaries is highly unlikely, due to NIMBY (“not in my backyard”) reactions and perceived public health issues (Thomas Outerbridge, personal communication, February 27, 2003; Vivian Toy, personal communication, February 25, 2003). In addition to the public opposition to building incinerators within the City, the Fresh Kills Closure Law (discussed earlier) also barred any future incinerator from being constructed in the City (Miller, 2000).

The opposition to modern WTE facilities within NYC has apparently not been as strong in the surrounding communities of the region. Evidence to this is the fact that in each of the counties that border the City to the north, east and west - in Westchester, Nassau and Essex (New Jersey) Counties respectively - WTE plants have been

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3 The opposition to WTE facilities within NYC has a long history, culminating with the cancellation of the proposed Brooklyn Navy Yard incinerator in 1996 (Gandy, 1995; Miller, 2000).

4 Although the same argument could be made to build incinerators as to reopen Fresh Kills - namely that by invoking emergency powers the Governor could allow the construction of incinerators in NYC - it is unlikely that this would happen. It is easier to justify reopening an existing facility (Fresh Kills) than to order building the extensive infrastructure for a WTE plant.
constructed over the past twenty years (ECRRF, 2003; HRRF, 2003; WCWTE, 2003). The operators of these facilities have even contracted to burn some of the waste that is exported from the City (Blood, 2002; Kloor, 2002; Lipton, 2001c, 2001d; Rein, 1999). In New York State, there are currently 10 WTE facilities that operate in geographically dispersed locations (see Figure 7.3.2) (DECWTE, 2003; LCSWM, 2002; NYS SWMP, 2000). Therefore, it is not inconceivable that NYC’s trash might be able to find disposal capacity at existing, new, or expanded facilities located in areas of New York State outside of the City. Indeed, the major political players involved in setting up such an arrangement have all demonstrated support for WTE. Commissioner of the DOS, John Doherty, has publicly endorsed the idea of WTE as a final disposal method for NYC’s trash (Kloor, 2002; Vivian Toy, personal communication, 2003). Mayor Bloomberg expressed his interest in WTE by officially considering the disposal method as an option for the City early in 2002 (Johnson, 2002c; Kloor, 2002). Finally, and most importantly, Governor Pataki was an avid supporter of WTE while he was mayor of the City of Peekskill. Pataki served as mayor at this Westchester County community from 1981 to 1984, during which time a WTE plant was established within his city’s boundaries at Charles Point (Hudson, 1984; Rein, 1999; Sack, 1994b).

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5 Four WTE facilities are in operation on Long Island alone – in East Northport, Ronkonkoma, West Babylon and Westbury (DECWTE, 2003).

6 The Westchester WTE serves as the prime disposal method for the County and was opened in 1984 amid much praise. At the time of its startup, the plant was hailed as the most technologically advanced of its kind in the world, and in succeeding years was looked to as a model of technical triumph (DeChillo, 1986; Hudson, 1984). Besides technical considerations, the Westchester WTE arrangement provided an inexpensive and reliable form of waste disposal to the county since the time it has opened (Alexander, 1993). Making this accomplishment that much more prominent is the fact that most other suburban counties in the New York metropolitan area have been forced to rely on an expensive export program to dispose of their residential solid waste.
Although Pataki’s mayoral predecessor negotiated the construction of the WTE facility with Westchester County officials, Pataki was well served by the facility’s contribution to the economic health of his ailing city. Partially due to the payments Peekskill received as a host community for the WTE facility, Pataki improved the financial picture of the town and as a result received much political credit. This achievement in turn fueled his successful run for the New York State Assembly in 1984.7

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7 After spending eight years in the State Assembly, Pataki was elected to the State Senate. He served in the Senate for two years until he was elected Governor in 1994 (Sack, 1994a).
Not only is Pataki’s rise in political stature arguably attributable to his experience with the WTE facility in Peekskill, but Pataki must also undeniably acknowledge the benefits of WTE host agreements. In addition to his first-hand experience siting a WTE facility, Pataki has been an outspoken supporter of statewide solutions to local solid waste problems. In 1987, as a member of the State Assembly, the current Governor introduced a bill to start a process of developing regional landfills throughout the state (Feron, 1987; Wilson, 1987). More recently, Pataki’s new appointment to head the State’s Public Service Commission – an independent panel that oversees utilities in the State – has signaled that electricity from WTE plants may count towards the Governor’s goal to achieve a statewide rate of 25 percent energy generation from renewable resources by 2013 (McKinley, 2003). This may have the effect of encouraging the construction of new WTE facilities in the State.

Pataki’s support of such measures apparently is due to his conviction that the State should be self-sufficient when it comes to trash management. This view has been summed up best by the Governor himself: “I’ve always said that this is one state and we want to function as one state and if it can be worked out consistent with the laws and regulations, and if the local communities are willing to accept it, this is not something I would object to” (Thompson, 1999). Given the Governor’s familiarity with WTE and host agreements, as well as his support for a statewide approach to such issues, it is only

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8 Host agreements act as compensation packages for towns to accept facilities that are for the benefit of the larger community. Host agreements may provide incentives in the form of money and inexpensive electricity (generated by the plant). The agreements can be based on a flat rate or on a tonnages-processed basis. Such public policy initiatives are oftentimes used for siting landfills, incinerators, and other locally undesirable land uses (LULUs) (Alexander, 1993; Chen, 1999; Kilborn, 2002). At the Westchester County WTE operation, for example, the City of Peekskill currently receives $6 million annually as part of its agreement with the county (Ferris, 2002). The Report of the Fresh Kills Task Force stipulated that any community that receives NYC waste via export must have a host agreement (FKTF, 1996).
fitting that he should be the chief executive of the Empire State when NYC is in desperate need of a new solid waste management plan.

The argument to ensure New York State's self-sufficiency in waste management can be viewed with both a political and economic lens. Politically, the State is best managing its own waste as a hedge against any possible federally-mandated interstate waste restrictions, or even against legal steps that can be taken independently by other states in this regard.\(^9\) The economic benefits include retaining the workforce (skilled and unskilled) of WTE facilities, plus the tax revenue that is generated from both the workers and the plant. If NYC decides to utilize in-state disposal options such as WTE, then a portion of the City's sanitation budget that currently is transferred to disposal operators in other states will remain within the state, thereby improving the local economy. If New York State does not maintain its own waste disposal facilities, other states may take away its business, along with the associated tax revenues.

Ironically though, in the years since Fresh Kills began it phase down, it has been easier for NYC to ship its solid waste to other states rather than to New York State facilities. This is perhaps due to the City's desire to avoid exacerbating the historical City-State rift by shipping its trash to circumspect upstate disposal facilities. It is at this opportune point that Pataki could use his powers as Governor, as well as the State bureaucratic apparatus to help negotiate host agreements starting with existing WTE facilities within the Empire State.\(^{10}\) A accomplishing this at one or more of the State's

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\(^9\) Pennsylvania has intervened to impede the flow of trash through the state, and was discussed earlier in this paper.

\(^{10}\) Negotiations would start with increasing capacity at existing New York State WTE plants. If not enough capacity is available through this route, then communities would be scoured throughout the State in search of willing partners who would host new facilities.
WTE sites would not be difficult. In 1999, American Ref-Fuel, the company that operates the Hempstead WTE facility (that already accepts a portion of the City’s waste) began marketing its Niagara Falls WTE site as another destination for the City’s trash (Rein, 1999; Thompson, 1999). The question that remains is one that has plagued the City since it began shutting Fresh Kills: “How to transport its daily trash output long distances in an economical and environmentally sound manner?” Since closing Fresh Kills, the City has relied mainly on long-haul trucks to transport its waste to out-of-state landfills. This strategy has proven to be expensive, as well as environmentally damaging.

New York City’s historical experience with freight transportation has not been good. Due to its poor rail links to the mainland, NYC has relied on truck transport for 97 percent of its regional freight traffic (Greenstein, 1999). However, one area of bulk transport in which the City has had great success is with river barges. The opening of the Erie Canal 175 years ago propelled NYC to the top position of American cities, where it has remained ever since. Six of the State’s 10 WTE facilities are accessible through the State’s river or canal system (see Figure 7.3.2). The other four facilities are located on Long Island, a relatively short drive from the City (DECWTE, 2003).

These geographic circumstances would allow the City to barge its trash through in-state waterways at a fraction of the cost of overland transport. If host agreements are reached with the respective communities for the expansion of capacity at their existing WTE facilities, NYC could easily relieve itself of its trash as it did for years – through its

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11 In recent years, the State of New York has invested considerable resources to transform the Canal System into a tourist destination. This has for the most part economically benefited communities that are located along the waterways.
MTS network. Barging the City's trash to upstate facilities would also take advantage of the infrastructure rehabilitation and revitalization program that Governor Pataki has initiated on the State's Canal System. As part of this program, the State has invested over $200 million in recent years in order to upgrade the network of canals across the state (NY Canal, 2003; NYSCC, 2003a).

7.4 Combining the Columbia Plan with PAYT

The Columbia University Plan, as laid out in the report, *Life After Fresh Kills: Moving Beyond New York City's Current Waste Management Plan*, was chosen in this paper as the superior alternative solid waste policy option for NYC based on financial, technical and administrative considerations. After examining the political concerns inherent in such an idea and addressing the questions of siting and transportation, it is clear that this proposal is the most logical and sensible choice for the City to pursue.

An element in the inherent attraction of the Columbia Plan is the use of a modern MRF that would capture 40 percent of the City's waste stream for recycling before the remaining output was shipped upstate for final disposal. While this diversion rate is significantly higher than what the NYC Recycling Law requires (a 25 percent diversion rate), a complimentary reduction in waste generation could be achieved through a PAYT

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12 Utilization of the State's historic Canal System, while being the best way to ship the City's trash output across the state, would only be available during the seven temperate months of the year (May through October) (NYSCC, 2003b). To accommodate this seasonal capacity deficiency, three options may provide an answer. One alternative would be to focus on expanding WTE capacity only along the Hudson River, which could be available for 12 months during most years. A second option would be to investigate the possibility of rail service from the Bronx to upstate WTE facilities via Albany (Greenstein, 1999). This option, however, may run into political opposition from advocates of the City's borough waste self-sufficiency principle (promulgated in the City's Solid Waste Management Plans of 1996 and 2000), as the Bronx would be seen as bearing the burden of the entire City's waste. A third option that would circumvent the local political opposition posed by the second alternative would be to barge trash to Albany (or another intermediate point), where it would be transferred to trains (Clarke et al., 1999; CSWMP, 2000).
program. Chapter 6 outlined the advantages of PAYT over other source reduction strategies, and outlined how the nation's largest city could successfully institute such a program. A conservative source reduction return rate of 14 percent from PAYT (as stated by the City's Independent Budget Office [2002]) would push the City's overall waste reduction rate (including recycling) to 54 percent.

Using the pre-Fresh Kills closure amount of 13,000 tons of waste generated per day as a baseline, a 54 percent reduction would equal a total of 5,980 tons per day that the City would have to dispose (FKTF, 1996). This smaller waste outflow would minimize the amount of expanded WTE capacity needed around the State and this smaller trash volume would reduce the number of new facilities required, or require smaller expansion of existing facilities.\textsuperscript{13} This setup would answer the New York State Solid Waste Management Plan 1999-2000 Update's exhortation to the City that "the need to export solid waste for disposal will have to be offset to the greatest extent possible by aggressive waste reduction and recycling efforts" (NYS SWMP, 2000, p. 50). The combination of a serious source reduction program, a beefed-up recycling system, and a lucid disposal method creates a truly comprehensive waste management structure for NYC.

\textsuperscript{13} The total permitted capacity for the State's 10 WTE facilities is slightly less than four million tons per year (DECWTE, 2003). At a reduced output of 5,980 tons per day, NYC's annual trash flow would equal approximately two million tons. This would represent a need to increase State WTE capacity by 50 percent. While this may sound like a lot, it is far below the need to double capacity that would be necessary if the City did not undertake this meaningful waste reduction scheme.
7.5 A Complete Plan

In addition to providing a workable garbage management system for NYC, this setup would be a real "integrated waste management" plan, as advocated by the U.S. EPA. The system would contain all elements of the EPA's "solid waste hierarchy" (except direct landfilling of waste), which is promoted as the preferred method of solid waste management for communities across the country. This not only would bring NYC's solid waste policies into compliance with its own recycling law, Local Law 19 of 1989, but it would also adhere to the New York State Solid Waste Management Act of 1988 and the federal Pollution Prevention Act of 1990 (Clarke et al, 1999; EPA530-F-99-038, 1999; NYC Recycling, 2001).

Almost certainly the most important characteristic that distinguishes this final plan from competing ideas is that it addresses NYC's waste stream from a "front, middle and end of pipe" perspective. From the front of the pipe, it reduces waste from being generated in the first place through PAYT. From the middle of the pipe, it diverts a significant portion of the waste towards recycling. Finally, from the end of the pipe, it reduces the volume (by up to 90 percent) and weight of the remaining waste by disposing of it in a WTE facility.

An important facet of the plan is that it reduces the City's ultimate reliance on landfills. In recent years, WTE has been increasingly recognized as a welcome replacement for the sanitary landfill. Modern emissions control technology has changed the environmental performance of WTE facilities to such a degree that they are considered ecologically superior to landfilling (Columbia, 2001; Gandy, 1995; NYS SWMP, 2000; Tammemagi, 1999; Themelis, 2002; Themelis et al, 2002). Besides
reducing the amount of waste that needs to be landfilled, WTE produces energy in the form of steam or electricity, recovers metals from the trash stream that would otherwise not be recoverable through recycling, and the resulting bottom ash may be used for a variety of construction applications.\textsuperscript{14} The end result is a relatively miniscule amount of waste that needs to be landfilled when compared to the current waste disposal practices of NYC.

This thesis has focused on assessing alternative schemes to uncover the best replacement policy for NYC's current residential solid waste management practices. By discussing the history behind the Big Apple's waste dilemma and comparing the current situation to what is occurring in three other large American cities, this investigation sets the proper groundwork for a comparison of eleven options proposed for NYC. The single best option that resulted from this comparison has to be coupled with a sound source reduction program to maximize its financial, technical, administrative and political efficiencies. There are not many individuals familiar with NYC's solid waste policies that would contest the charge that a prerequisite for remedying the current system is a re-examination of the City's policies from the ground up. That type of reevaluation is what this thesis has attempted to accomplish while trying to offer the most practicable solution.

NYC's inability to institute a farsighted solid waste policy that would benefit future generations is beginning to take a costly toll on the present generation. As Mayor

\textsuperscript{14} As an example of the amount of energy produced through WTE technology, in 1999 the 10 WTE facilities in New York State generated "enough electricity to provide power to over 220,000 homes for one year, roughly the equivalent to the number of households in the cities of Albany, Binghamton, Rochester and Syracuse combined" (NYS SWMP, 2000, p. 37). The metals that are recovered through WTE are usually not readily recyclable through standard municipal recycling programs. For example, components of products such as furniture or small appliances may contain metal that is not easily extractable under number circumstances. However, in a WTE operation this material is normally left in the residual ash and subsequently sold as scrap.
Michael Bloomberg put it (perhaps literally as well as metaphorically): "We have to do something with solid waste. It is going to bankrupt us if we don’t" (Steinhauer, 2002b).

Perhaps the only important factor not measured in this assessment is the strength and courageousness of the region’s political leaders. For an effective transformation in the way the City manages its wastes to occur, elected officials in New York must have the acumen and wherewithal to bravely make the right choices for the City’s future.

### 7.6 A Final Thought

After all is said and done, Fresh Kills – that behemoth of a dump whose closing set into motion the chain reaction of policy blunders that has led us to where we are today – is still here and will still be here to serve as a mountain monument to the American throwaway society of the twentieth century. What does the future hold for Fresh Kills?

At the present time, DOS is conducting an international competition, which is in the finalist stages, to select a land-use plan and design for the landfill’s upcoming second life. Over the course of the next half-century, Fresh Kills will most likely be turned into a gigantic park comprising sports fields, bike paths, open space, wetlands, and other recreational opportunities. A memorial to the victims of the 9/11 terrorist attacks will also be located at the site. At 2,200 acres, the landfill is three times the size of Central Park, which will make the future Fresh Kills Park the largest park in the City. The cost estimates to convert the landfill into a world-class recreational amenity range up to $1 billion dollars – an amount equal to the current size of DOS’s annual budget (Blood, 2002; Stewart, 2002).
While the hills of garbage at Fresh Kills subside, decompose and wait for parks to be built on top of them, the landfill could become a tourist destination, attracting visitors from all over the world. Indeed, in 1996 - five years before Fresh Kills stopped accepting the City's waste - DOS began offering two-hour guided tours of the dump. However, before the landfill tours could even be publicized with the potential to perhaps become one of NYC's top visitor attractions, then-Mayor Rudolph Giuliani cancelled the program, citing the insensitivity it showed toward Staten Islanders (Buckley, 1996; Letts, 1996; Siegel, 1996; Tim, 1996). Less than two months after shutting out the burgeoning visits to Fresh Kills, the mayor bestowed his own sensitivity to Staten Island and announced that he would also shut down the infamous dump to the City's enormous daily waste stream. Nonetheless, adventurous tourists have been visiting Fresh Kills for years to witness one of the most remarkable sites in NYC.
This appendix provides an explanation of the calculations used to determine the financial data listed in Table 4.1.1 in Chapter 4. The following information lists each of the eleven alternative plans. Each alternative plan is broken down into calculations of its capital and annual operating costs, as well as the expected cost of each plan over a 30-year period. In order to simplify the comparison between alternative plans, only a strict and straightforward financial assessment has been made, and amounts are rounded to the nearest million. The calculations do not include variations accounting for expected inflation, contingencies, interest and other charges. Rather, the present value of the 30-year expenditures of each plan is assessed using a discounting rate of 5 percent annually. Initial capital costs are then subtracted from the present value amount. The present value is calculated through the following formula:

\[ P = A \left[1-(1+r)^n/r\right] \]

whereas,
- \( P \) = total present value
- \( A \) = annual operating and maintenance
- \( r \) = discounting rate (5% in every case)
- \( n \) = number of years (30 in each case)

The dollar amounts are taken directly from the report of the proposed plan, newspaper articles or other sources. The capital or annual expenditure data for plans that did not have cost forecasts are extracted from elements of similar proposals (i.e. Bloomberg Incineration ~ Columbia Plan, or Giuliani I ~ Giuliani II). The capital and annual costs take into account the proposed recycling/diversion rate proposed for that given plan; if a recycling rate was not explicitly proposed for a plan, the recycling rate that NYC was achieving at the time of the plan's release was used. In all of the plans, a baseline of 13,000 tons per day (TPD) and 4.5 million tons per year (TPY) is used for the City's trash output (FKTF, 1996; Columbia, 2001).

**Giuliani I**

*Capital Costs:*

3 Enclosed Barge Unloading Facilities (EBUFs):

$100,000,000 – cost based on capital costs and tons per day (TPD) capacity for EBUF planned for Giuliani II Plan (Stewart, 2000)
One Truck to Rail Facility in the Bronx:

$31,809,220 – for similar facility planned for Giuliani II Plan (FEIS, Appendix F-B, 2000)

One Truck to Rail Facility on Staten Island:

$26,244,200 – cost for similar facility planned for Giuliani II Plan (FEIS, Appendix F-B, 2000)

Total Capital Costs:

$100,000,000 + $31,809,220 + $26,244,200 = $158,053,420

Annual Operating Costs:

$233,000,000 – cost taken from Lipton (2000), who mentioned that, at $323 million, the Giuliani II Plan would incur an annual expense of $90 million more than the Giuliani I Plan. Therefore, $323,000,000 - $90,000,000 = $233,000,000

Note: This assessment of annual costs does not include the cost of recycling, as the Giuliani I Plan did not include a formal plan for recycling. It is however assumed that the capital and annual costs extrapolated from the Giuliani II Plan (and used here) take into account the City’s intention to achieve a 25% recycling rate, and are therefore designed to handle this level of trash throughput.

30-Year Total Costs:

Present Value = 233,000,000[1-(1+.05)^{-30}]/.05 = $3,581,781,089.26 ≈ $3,582,000,000 this 30-year present value of the annual operating costs is added to the initial capital costs incurred at the plan’s inception:

$3,582,000,000 + $158,053,420 = $3,740,053,420

Giuliani II

Capital Costs:

$50,000,000 – cost for Linden, New Jersey EBUF (Stewart, 2000)

$130,787,150 – total cost for retrofitting 2 existing Marine Transfer Stations (MTSs) and constructing 2 new compaction/containerization facilities (FEIS, Appendix F-B)

Total Capital Costs: $50,000,000 + $130,787,150 = $180,787,150 ≈ $181,000,000
Annual Operating Costs:

$323,000,000 – cost for plan as stated in the CSWMP (2000)

$12,400,000 – cost for achieving yearly 25% recycling goal (CSWMP, 2000)

Total Operating Costs: $323,000,000 + $12,400,000 = $335,400,000 \approx \textbf{$335,000,000$}

30-Year Total Costs:

$335,000,000 \left[1-(1+.05)^{-30}/.05\right] = 5,149,771,094.01 \approx 5,150,000,000

added to capital costs:

5,150,000,000 + 181,000,000 = \textbf{$5,331,000,000$}

Bloomberg Incineration

Capital Costs:

$400,000,000 - capital cost for one 2,000 TPD model incinerator (Columbia, 2001)

13,000 TPD of MSW generated at time of Fresh Kills' closure

13,000 – 12% citywide planned recycling rate at time of plan announcement (IBO, 2002b; NYC Recycling, 2001) = 11,440 TPD

At 11,440 TPD, NYC would need 6 2,000 TPD capacity-incinerators, therefore Total Capital Costs:

$400,000,000 \times 6 = \textbf{$2,400,000,000$}

Annual Operating Costs:

$35,000,000 – cost for one incinerator (Columbia, 2001)

$121,000,000 – \textit{revenue generated} from one incinerator (Columbia, 2001)

Therefore:

$35,000,000 \times 6 = \textbf{$210,000,000$}

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1 The citywide recycling rate of 12% is obtained from two sources. As stated in NYC Recycling (2001), the City had been achieving an approximate 20% recycling rate before the suspension of the glass and plastic portions of the recycling stream. IBO (2002b) states that, as a result of the recycling suspension by the Bloomberg administration in mid-2002, the citywide recycling rate fell by 8%. As a result, 20% - 8% = 12%.
-$121,000,000 \times 6 = -$726,000,000

$210,000,000 + ($726,000,000) = $516,000,000

*Annual operating costs produce revenue of $516 million per year

30-Year Total Costs:

$516,000,000 \left[1 - (1 + 0.05)^{-30}/0.05\right] = 7,932,184,729.87 \approx 7,932,000,000

the initial capital costs are subtracted from this generated revenue:

$7,932,000,000 - 2,400,000,000 = $5,532,000,000

*30-Year operating costs produce revenue of $5.532 billion

**Bloomberg Retrofit**

Capital Costs:

$280,000,000 – total cost for retrofit of 5 MTSs (CCDD, 2002)

$168,000,000 – total cost for 3 additional MTSs [this amount is derived from dividing $280 million – the cost of the 5 MTSs – by 5 in order to get the average cost per facility; this amount is then multiplied by 3, which is $168 million: 280/5 \times (3) = $168 million] (CCDD, 2002)

$26,244,200 – cost of new Staten Island export facility, derived from similar facility planned for the Giuliani II Plan (FEIS, Appendix F-B, 2000)

Total Capital Costs: $280,000,000 + $168,000,000 + $26,244,200 = $474,244,200

Annual Operating Costs:

13,000 TPD of MSW generated at time of Fresh Kills’ closure
13,000 – 12% citywide recycling rate at time of plan announcement (IBO, 2002b; NYC Recycling, 2001) = 11,440 TPD

At 11,440 TPD, operating costs for the MTS system would equal $57,114,000 – a number obtained from facilities planned for similar capacity for the Giuliani II Plan (FEIS, Appendix F-B, 2000)

An assistant sanitation commissioner at a City Council hearing in January 2003 confirmed an amount similar to this number for the Bloomberg Retrofit Plan (Christian, 2003).
In addition, the cost of disposing of an average of 3,960,000 tons per year of waste [4.5 million tons per year (Columbia, 2001) minus 12% recycling rate] is equal to $45.26 per ton in the Mid-Atlantic region [NYC disposes of most of its waste in Pennsylvania and Virginia – two Mid-Atlantic states] (Repa, 2002), therefore:

\[
3,960,000 \text{ (tons of waste per year)} \times 45.26 = 179,229,600
\]

Total Annual Operating Costs:

\[
57,114,000 \text{ (MTS system operating costs) + 179,229,600 (tipping fees) = 236,343,600} \approx 236,000,000
\]

Note: annual costs estimates are conservative, as transportation costs have been omitted.

30-Year Total Costs:

\[
236,000,000 \left[1-(1+.05)^{-30}/.05 \right] = 3,627,000,000 \approx 3,627,000,000
\]

added to capital costs:

\[
3,627,000,000 + 474,000,000 = 4,101,000,000
\]

Manhattan Report

Capital Costs:

The following cost estimates are taken from the Bloomberg Retrofit Plan, which calls for the same capital cost expenditure as this plan.

$280,000,000 – total cost for retrofit of 5 MTSs (CCDD, 2002)

$168,000,000 – total cost for 3 additional MTSs [this amount is derived from dividing $280 million – the cost of the 5 MTSs – by 5 in order to get the average cost per facility; this amount is then multiplied by 3, which is $168 million: 280/5 x (3) = $168 million] (CCDD, 2002)

$26,244,200 – cost of new Staten Island export facility, derived from similar facility planned for the Giuliani II Plan (FEIS, Appendix F-B, 2000)

Total Capital Costs: $280,000,000 + $168,000,000 + $26,244,200 = $474,244,200

Annual Operating Costs:

4,500,000 tons per year of waste generated in NYC (Columbia, 2001)

plan calls for 35% recycling rate
4,500,000 (tons per year) - 35% (diversion rate) = 2,925,000 tons per year
13,000 TPD - 35% (diversion rate) = 8,450 TPD

At 8,450 TPD, operating costs for the MTS system would equal $44,984,000 – a number obtained from facilities planned for similar capacity for the Giuliani II Plan (FEIS, Appendix F-B, 2000)

Additionally, the cost of diverting 35% of the City’s waste through the recycling system set up at the time of the plan’s release would cost an extra $17,360,000 per year. This amount is obtained from the Giuliani II Plan, which estimated that in order to achieve a 25% diversion rate, the City would need to spend $12.4 million (CSWMP, 2000)

In addition, the cost of disposing of an average of 2,925,000 tons per year of waste [4.5 million tons per year (Columbia, 2001) minus 35% recycling rate] is equal to $69.07 per ton in New York State [plan calls for disposal sites in New York State] (Repa, 2002), therefore:

2,925,000 (tons per year) x $69.07 (tipping fee per ton) = $202,029,750

Total Operating Costs: $44,984,000 (operating cost for MTS system) + $17,360,000 (recycling costs at 35% diversion) + $202,029,750 (tipping fees) = $264,373,750 ≈ $264,000,000

*Note: annual costs estimates are conservative, as transportation costs have been omitted*

30-Year Total Costs:

264,000,000[1-(1+.05)^-30]/.05] = 4,058,327,071.10 ≈ 4,058,000,000

added to capital costs:

4,058,000,000 + 474,000,000 = $4,532,000,000

*Comptroller Report*

*Capital Costs:*

*$0.00$ - the cost for startup of the plan is not expected to incur a capital expense since the plan is focused on compacting trash into shipping containers on collection trucks; the new collection trucks would be phased in to replace the existing fleet; the cost for this endeavor is expected to come from the normal DOS procurement budget
Annual Operating Costs:

Plan was released at a time when the City was attaining an overall 18% recycling rate. An 18% diversion in the City’s annual 4,500,000-ton waste stream equals a total of 3,690,000 tons per year (NYC Recycling, 2001).

In order to ultimately dispose of this waste, the City would pay a tipping fee of $45.26 per ton in the Mid-Atlantic states [NYC disposes of most of its wastes in Pennsylvania and Virginia, two states within the Mid-Atlantic region] (Repa, 2002), therefore:

Total Annual Operating Costs:

\[3,690,000 \text{ (tons per year)} \times 45.26 \text{ (tipping fee per ton)} = 167,009,400 \approx \$167,000,000\]

Note: annual costs estimates are conservative, as transportation costs have been omitted

30-Year Total Costs:

\[167,000,000\left[1-(1+.05)^{-30}/.05\right] = 2,567,199,321.49 \approx \$2,568,000,000\]

Note: This is the total amount, as no initial capital costs were incurred for this plan.

OWN Report

Capital Costs:

The following cost estimates are taken from the Bloomberg Retrofit Plan, which calls for the same capital cost expenditure as this plan, besides the additional recycling facility listed below.

$280,000,000 – total cost for retrofit of 5 MTSs (CCDD, 2002)

$168,000,000 – total cost for 3 additional MTSs [this amount is derived from dividing $280 million – the cost of the 5 MTSs – by 5 in order to get the average cost per facility; this amount is then multiplied by 3, which is $168 million: 280/5 x (3) = $168 million] (CCDD, 2002)

$26,244,200 – cost of new Staten Island export facility, derived from similar facility planned for the Giuliani II Plan (FEIS, Appendix F-B, 2000)

$120,000,000 - cost of new Staten Island recycling facility, derived from similar Materials Recovery Facility (MRF) based on capacity (25% recycling diversion, as called for in plan), and as described by Columbia (2001)
Total Capital Costs: $280,000,000 + $168,000,000 + $26,244,200 + $120,000,000 = $594,244,200 ≈ $594,000,000

Annual Operating Costs:

$12,400,000 - cost of 25% recycling diversion program called for in plan; amount is the same that is given for same recycling goal mentioned in the Giuliani II Plan (CSWMP, 2000)

$47,595,000 - for facilities management; this number is obtained from facilities planned for in the Giuliani II Plan, which had similar capacities (CSWMP, 2000)

$152,752,500 - the cost of disposing of an average of 3,375,000 tons per year of waste [4.5 million tons per year (Columbia, 2001) minus 25% recycling rate] is equal to $45.26 per ton in the Mid-Atlantic region [NYC disposes of most of its waste in Pennsylvania and Virginia – two Mid-Atlantic states] (Repa, 2002), therefore:

3,375,000 (tons of waste per year) x $45.26 (tipping fee per ton) = $152,752,500

Total Annual Operating Costs:

$12,400,000 + $47,595,000 + $152,752,500 = $212,747,500 ≈ $213,000,000

30-Year Total Costs:

$213,000,000[1-(1+.05)^{30}/.05] = 3,274,332,068.73 ≈ 3,274,000,000

added to capital costs:

3,274,000,000 + 594,000,000 = $3,868,000,000

Columbia Plan

Capital Costs:

13,000 TPD of trash is generated in NYC (Columbia, 2001)

Plan calls for 40% recycling rate, therefore:

13,000 - 40% = 7,800 TPD generated after recycling

$1,600,000,000 - cost of constructing four 2,000 TPD incinerators ($400,000,000 a piece) to handle NYC daily trash outflow (Columbia, 2001)
$180,000,000 - cost of constructing three 0.725 million ton per year modern MRFs ($60,000,000 a piece) to handle NYC’s 40% recycling rate (equaling 1.8 million tons per year of recyclables) (Columbia, 2001), therefore:

$1,600,000,000 + $180,000,000 = $1,780,000,000

Annual Operating Costs:

$140,000,000 - costs for four incinerators (Columbia, 2001)

$484,000,000 - revenue from operating four incinerators (Columbia, 2001)
net operating revenue for four incinerators: $344,000,000

$40,800,000 - cost of operating three MRFs

$66,000,000 - revenue from operating three MRFs
net operating revenue for three MRFs: $25,200,000

Total Annual Operating Revenue:

$344,000,000 + $25,200,000 = $369,200,000

30-Year Total Costs:

$369,000,000[1-(1+.05)^{30}]/.05] = 5,672,434,428.92 ≈ 5,672,000,000
capital costs are subtracted:
5,672,000,000 − 1,780,000,000 = $3,892,000,000

*30-Year operating costs produce revenue of $3.892 billion

Upstate Landfill Plan

Capital Costs:

$792,000,000 - cost of siting 16 new landfills in upstate New York (Rathje, 2001); (each landfill is roughly $49,500,000)

Annual Operating Costs:

$100,000,000 - cost of utilizing City-owned landfill infrastructure, with 18% recycling rate (rate of recycling at time of plan’s announcement) (Toy, 1996b)
Note: annual costs estimates are conservative, as extra transportation costs have been omitted.

30-Year Total Costs:

\[100,000,000 \times (1-(1+.05)^{-30}/.05) = 1,537,245,102.69 \approx 1,537,000,000\]

Capital costs are added:
\[1,537,000,000 + 792,000,000 = $2,329,000,000\]

Reopening Fresh Kills

Capital Costs:

$0.00 - cost of reopening the Fresh Kills landfill; minimal investment would be needed as site and remaining capacity still exist

Annual Operating Costs:

$100,000,000 - cost of disposing of NYC's trash with a 20% recycling rate (rate at time plan was announced) (IBO, 2002b; NYC Recycling, 2001); amount reflects disposal costs prior to phase down of the landfill (Toy, 1996b)

30-Year Total Costs:

\[100,000,000 \times (1-(1+.05)^{-30}/.05) = 1,537,245,102.69 \approx $1,537,000,000\]

Note: This is the total amount, since no initial capital costs were incurred for this plan.

Status Quo

Capital Costs:

$0.00 - maintaining the status quo requires no capital investment

Annual Operating Costs:

$400,000,000 - most recent cost incurred for maintaining an elaborate truck-based system of interstate hauling and disposal (Purnick, 2002a)

30-Year Total Costs:

\[400,000,000 \times (1-(1+.05)^{-30}/.05) = 6,148,980,410.75 \approx $6,149,000,000\]

Note: This is the total amount, since no initial capital costs were incurred for this plan.
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