Exploring Economic Development Opportunities in Recycling

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August 1993

TABLE OF CONTENTS

Executive Summary 1

Introduction 11

One: Recycling and Economic Development 16

Two: Overview of Recycling-Related Industries 25

Three: Collection, Sorting and Consolidation 35

Four: Brokerage Services 60

Five: Value-Added Processing 66

Six: Fabricating New Products 88

Seven: Fostering Innovation and New Enterprise Development 111

Eight: New York's Existing Recycling Firms: Problems and Opportunities 117

Nine: Opportunities for Community Participation 133

Ten: Conclusion 146

EXECUTIVE SUMMARY

As they strive to overcome the effects of a severe recession, New Yorkers have sought to identify sectors of the city's economy that might contribute to a new cycle of growth. One of the areas that has attracted attention is the array of industries involved in recycling the materials that New York's residents and businesses routinely discard.

Developing markets for materials recovered from the waste stream is essential to the success of New York's recycling program. At the same time, expanding the capacity to transform these materials into industrial commodities or new manufactured products represents an opportunity for economic development in the city. This report identifies recycling-related industry segments that appear to have the greatest potential for development in the city; analyzes the underlying characteristics that might make New York an advantageous location for these businesses; and suggests how the city might capitalize on opportunities for recycling-related economic development.

New York's effort to develop recycling-related industries occurs against the backdrop of a continuing decline in routine production activity in the city. Although New York's economic future seems increasingly linked to the competitive advantage it enjoys as a center for the creation and sophisticated application of intellectual capital -- the ideas and information that shape the worldwide production of goods and services -- pursuing the development of recycling-related industries also makes sense, for several reasons.

First, the development of these industries will result in the creation of new business and job opportunities. We estimate that during the next five years, creation or expansion of recycling-related businesses could create 3,000 to 4,000 new jobs within the city. Many of these will be jobs that can be filled by people with limited skills. Moreover, most of these jobs will be created in areas of the city that the boom of the 1980's all too often passed by, such as Hunts Point, Williamsburg, Red Hook, Maspeth and the northwest shore of Staten Island.

Development of recycling-related industries can also help businesses throughout the city reduce their waste disposal costs; and can help city government reduce its solid waste management costs as well. Finally, by improving the effectiveness of the city's recycling program, recycling-related industries can help improve the quality of the city's environment -- and thus make New York a more attractive place to live, work and do business.

To understand what types of businesses might represent the city's best development opportunities, we need to consider first the types of activity in which they are involved. These include:

* *Collection, sorting and consolidation;*

* *Brokerage services;*

* *Value-added processing; and*

* *Fabrication of new products.*

Within each of these sectors, we can also group industry segments according to their respective stages of development -- *mature, emerging and transforming industries.*

Segmenting recycling-related industries this way helps us focus on the advantages and disadvantages that New York presents as a location for various types of business. New York's disadvantages are familiar -- high costs for land, construction and energy; restrictions on new sources of air and water emissions; lengthy regulatory and permitting processes; etc. Its advantages as a location for recycling-related industries include:

* *Concentrated supplies of secondary materials;*

* *Concentrated markets for products made with those materials;*

* *Possible savings in transportation costs;*

* *Ready access to marketing and distribution networks, especially for exports;*

* *Integration effects -- the advantages that local recycling firms can derive from expanding into higher-value-added activities.*

* *Cluster effects -- the advantages a firm can derive from being part of a geographically concentrated group of related businesses.*

How these advantages and disadvantages play out in various business segments determines where new opportunities for development are most likely to arise. Below we identify some of New York's most promising opportunities for recycling-related development, and the implications of these findings for the city's solid waste management and economic development policies.

Collection, Sorting and Consolidation

Meeting New York City's ambitious recycling goals will require the development of additional capacity for sorting and consolidation of secondary materials, both those collected by the Department of Sanitation and those collected by commercial carters. Development of this capacity represents one of the city's most significant recycling-related economic development opportunities. But while the *collection* of secondary materials is inherently a local activity, there is no guarantee that the expansion of sorting and consolidation facilities will occur within the city's boundaries. Ensuring that it does will require an aggressive city effort to promote the development of such facilities. Moreover, even if the need for new capacity is met in part by the construction of city-owned "materials recovery facilities," the city will still need to encourage substantial private investment in new or expanded facilities.

There are several steps the city can take to encourage the development of new capacity in this sector.

* *Maintaining land use, regulatory, economic development financing and tax policies that will foster private investment in new sorting and consolidation capacity.*

* *Using private capital and private expertise to develop and operate the "materials recovery facilities" that will sort and consolidate the recyclable materials collected by the Department of Sanitation, in ways that are consistent with the city's need to ensure the availability of efficient, flexible and dependable processing capacity.*

* *Using contracts for the processing of materials collected by the Department of Sanitation as an incentive for commercial processors to develop additional capacity within the city for high-quality processing of commercial recyclables.*

It is worth noting that *encouraging* private development should not mean *subsidizing* it. The statutory mandate to recycle creates a powerful incentive for private companies to provide the services that waste generators need. The city's role should be to create the conditions that let the market work efficiently and effectively; and to use the leverage that its own procurement of processing services affords to accelerate the development of new capacity within the city.

New York can also enhance the overall effectiveness of its recycling program, and create new businesses and jobs, by promoting the continued development of specialized

collection systems. These are systems that provide separate handling of materials that would lose much of their value if commingled with the generic waste stream, or that cannot easily be handled through regular collection procedures. Examples include:

* *Developing community-based systems for collecting materials such as used clothing and household appliances.*

* *Continued development of enterprises that collect and sort glass from commercial and institutional sources before it is commingled in the generic waste stream.*

* *Encouraging the development of businesses that recover, refurbish and resell used building products and materials.*

* *Creation of regulatory and tax incentives for private collection of discarded tires.*

While it is unlikely to "create jobs" in any direct sense, the process of heightened competition and rationalization that appears to be under way in the commercial carting industry should benefit the city's economy, both by increasing the quality and lowering the cost of waste management services. The city can promote these changes by:

* *Encouraging experienced, well-qualified waste management companies that do not now serve the New York market, or who do so only on a limited basis, to compete actively for commercial carting business in the city.*

* *Promoting increased awareness of opportunities for competition, both within the industry and among its customers.*

* *Encouraging rationalization through consistent, rigorous enforcement of regulations in areas such as commercial source separation and transfer station operations.*

Brokerage Services

While brokerage services make an important contribution to the overall effectiveness of recycling, they appear to have little potential for growth. Moreover, the city has little ability to affect the location decisions of these "phone and fax" businesses. There is one area, however, in which there may be some potential for new business -- the

development of a system of exchange-based trading of recycled materials. The city should:

* *Monitor carefully the progress of the pilot project now being undertaken by the Chicago Board of Trade, aimed at testing a system for electronic trading of certain recycled materials.*

* *In cooperation with New York's commodities exchanges, and with suppliers and buyers of secondary materials, explore the feasibility of establishing a forum for trading these materials, under the auspices of one or more of the exchanges.*

Value-Added Processing

Value-added processing activities include any type of physical transformation of secondary materials that make them more valuable to fabricators of new goods or other end-users. Growth prospects for many of these activities are strong. New York, moreover, represents an attractive location for many of these activities, due to such factors as supply concentration and integration advantages. The fact that these operations tend to be relatively small-scale, and to need relatively little construction, also make them promising candidates for development in the city.

Industry segments with prospects for development in New York include shredding and densifying steel cans, cleaning and grinding waste glass to make furnace-ready cullet, shredding discarded tires, pelletizing plastics, and composting organic wastes. To encourage development of these and other value-added processing businesses, the city can:

* *Whenever possible, encourage the development of value-added processing in conjunction with MRF's and commercial processing activities.*

* *When selecting sites for MRF's, take into account the availability of adjoining or nearby space for the development of value-added processing facilities.*

* *Consider "pre-packaging" sites for development of these facilities, in order to help small firms avoid the costs and delays often associated with the city's land use and environmental approval processes.*

* *Wherever possible, use the city's procurement process to help build markets for locally processed materials.*

* *Devise strategies for helping value-added processing businesses reduce their costs in areas in which the city can exert some influence, such as energy and residual waste disposal costs.*

Fabricating New Products

Many of the manufacturing industries that are potential users of New York's secondary materials -- glass bottle manufacturers and makers of tissue products, for example -- are cost-driven, highly-standardized mature industries that are not likely to develop new production facilities in the city. There are nevertheless certain "niche" industry segments for which New York may be able to compete. They include:

* *Industries in which the city offers both supply and market concentration, such as newsprint and office paper mills.*

* *The manufacture of plastic products -- an industry that can benefit from integration with local collection and processing activities; and that can employ small-scale, flexible production facilities that may be well-suited to a New York location.*

* *The manufacture of recycled building products -- an industry in which the city's procurement and regulatory processes may provide some capacity to stimulate the development of new businesses.*

To stimulate development in these and other industry sectors, the city needs to tailor its approach to reflect the factors that make New York an attractive location for particular types of businesses. For example, the city can:

* *Use its ability to aggregate and guarantee supplies to stimulate the development of local fabricating businesses in those industry segments where the ability to secure a steady supply of high-quality materials is critical.*

* *Use its procurement process to help build markets for locally-fabricated products with recycled content.*

* *Encourage and work with commercial processors and value-added processors interested in expanding into the fabrication of new goods.*

* *As in value-added processing, consider the development of prepackaged sites suitable for small fabricating businesses.*

* *Strive to narrow the disadvantages that New York City manufacturers face in areas such as energy costs.*

Fostering Innovation and New Enterprise Development

New York City should also focus on opportunities for new business development based on product and process innovation. New York already possesses the human and institutional resources needed for such development -- scientific, technical and managerial personnel, leading research institutions, and sources of capital. Research and development activity can itself be a source of jobs -- limited in number perhaps, but generally high in quality. Moreover, if the city can successfully encourage new industries to start up here, it should be able to capture at least part of their subsequent growth as well. Product and process innovations can also strengthen the city's recycling program, by increasing demand for locally generated secondary materials -- and in some cases, by creating new uses for "problem" materials. To take advantage of its strengths in this area, the city should:

* *Make limited amounts of material available at low or no cost to firms engaged in new product and new process development.*

* *Permit limited sole-source procurement of locally manufactured products, where such procurements might help create markets for products that provide new uses for "problem" materials such as discarded tires.*

* *Work with officials of the State Department of Environmental Conservation to amend the state's solid waste management regulations (Part 360) to make clear that the Department's accelerated permitting procedure for R&D projects can be applied to pilot projects aimed at testing the commercial viability of new products and processes, as well as to scientific research.*

* *Work with New York financial institutions and corporations to ensure the availability of debt and equity financing for new recycling-related enterprises.*

* *Consider establishment of a program of research grants to support the development of new products using the city's secondary materials; and new processes that will improve the competitiveness and productivity of local recycling-related industries.*

* *Support technical assistance programs aimed at helping recycling firms adopt process improvements specific to their businesses.*

Existing Local Firms: Problems and Opportunities

The small to mid-sized firms already doing business in New York represent a prime resource for recycling-related economic development. While high costs and other factors often make it difficult to attract growing firms from outside the city, many local recycling-related businesses already have a strong commitment to New York. Many have taken advantage of opportunities to expand from collection into commercial processing, higher value-added processing and even fabrication, and are prepared to invest in further development.

Discussions with executives of these companies highlight the problems that many of them face doing business in New York. As it seeks to encourage continued development of recycling-related businesses, the city will need to address these problems.

* *The city should work with the state and with local businesses to alleviate the disadvantages that New York firms face as a result of high costs in areas such as workers compensation.*

* *The city should consider modification of the price preferences its procurement process now offers for products made with recycled materials, to provide an additional preference for those manufactured locally using local materials.*

* *As it considers revisions of the provisions of the zoning code that govern industrial areas, the City Planning Commission should take into account the city's need to develop its commercial processing infrastructure, as well as opportunities for the growth of recycling-related industries.*

* *While it may be necessary, especially in the early stages of development of its program, for the Department of Sanitation to retain considerable flexibility in its contracts for processing services, the Department should consider ways to make its contractual relationships more stable and more predictable for its business partners.*

Opportunities for Community Participation

Since many of the areas where recycling-related development is likely to occur are adjacent to low-income communities, residents of these communities have an interest in making sure their concerns about such development are taken into account. At the same time, recycling-related development can also offer these communities new entrepreneurial and employment opportunities. Community-based economic development organizations can play an important role in addressing these issues.

Community organizations can serve as brokers between local neighborhoods and outside investors, and as job training and placement agencies. They can directly create new recycling enterprises -- either on their own or through joint ventures with established companies. They can also act as catalysts for recycling-related development by identifying local recycling opportunities and helping local firms take advantage of them.

There are several ways the city can help community organizations participate in recycling-related development. The city should:

* *Require firms that are locating new facilities in the city, and that receive significant economic development benefits, to explain how they plan to respond to community concerns, and how they will provide employment, training and contracting opportunities to local residents and businesses.*

* *Encourage (but not require) firms that are new to the city to work with local economic development organizations in planning and developing recycling-related businesses.*

* *Work with selected community organizations to explore areas in which there maybe specific near-term opportunities for cooperation between businesses and such organizations -- for example, in the development of community-based systems for collection of used clothing.*

* *Consider the creation of a program aimed at helping community organizations participate more effectively in recycling-related economic development, by providing information, training and technical assistance.*

* *Give special attention to development of opportunities for minority business participation in recycling-related industries, both directly and as joint venture partners.*

Conclusion

Beyond the specific opportunities identified in this report, our analysis has broader implications for New York City's solid waste and economic development policies.

* *City personnel need to become familiar with the underlying dynamics of recycling-related industries, so as to anticipate and act more effectively on emerging development opportunities.*

* *As the development of the city's recycling program requires city agencies to take on new and unfamiliar roles, they will need to operate in a more business-like fashion, with respect to matters like quality control and contracting procedures.*

* *The experience and capabilities of local companies already engaged in recycling-related businesses represent one of the city's most valuable resources, and should be seen as key elements in its recycling-related development strategy.*

* *The ability to shape markets for products that incorporate recycled materials through its procurement and regulatory processes is one of the city's most powerful tools for recycling-related development -- one that city agencies should be prepared to use aggressively and creatively.*

* *Finally, extensive community participation is essential to the success of recycling-related development in New York City.*

Recycling-related development is neither an economic nor an environmental panacea. But it can provide new jobs and business opportunities for thousands of New Yorkers -- including many for whom other opportunities might be hard to come by. And it can help make New York a more livable, more sustainable city in the years ahead. For these reasons, it deserves a place on New York's agenda in the 1990's.

INTRODUCTION

As they strive to overcome the effects of a severe and prolonged recession, New York City officials, local economic development organizations, business groups and others with an interest in the city's future have sought to identify sectors of its economy that might contribute to a new cycle of growth. One that has attracted considerable attention is the broad array of industries involved in recycling the mass of materials routinely discarded by New York's residents and businesses. Especially with the city's Solid Waste Management Plan mandating more extensive recycling of both residential and commercial waste, recycling-related enterprise seems to have the potential to be a new "growth industry."

In order to realize that potential, city officials need to understand the nature of the opportunities that might arise from the expansion of recycling, and how the city can best take advantage of them. To help explore these issues, Mayor David N. Dinkins in January 1993 appointed an Advisory Council on the Development of Recycling Businesses and Markets. The Council's twenty-five members include representatives of the industries that collect, process and use recycled materials, the financial community, environmental groups, and local economic development organizations. The mayor also established an Interagency Task Force, chaired by

Deputy Mayor Barry Sullivan, to coordinate the work of city agencies involved in recycling and economic development.

To assist the Task Force in its work, New York University's Urban Research Center and Appleseed, an economic development consulting firm, undertook an assessment of recycling-related industries, and their potential for development in New York. This report presents the results of our work, and suggests what implications they may have for the city's waste management and economic development programs.

Study Approach

Our research included several elements:

* A review of the many analyses of markets for recycled materials conducted in recent years for the New York City Department of Sanitation, the New York State Office of Recycling Market Development, the Environmental Defense Fund, and other organizations.

* Analysis of published data from the U.S. Department of Commerce, the New York State Department of Labor, and other sources.

* Site visits and face-to-face interviews with executives of 20 companies involved in recycling-related activities, both in New York City and elsewhere; with managers of four community-based organizations active in recycling-related economic development; and with representatives of state and city agencies and trade associations.

* Eight focus groups with executives of small companies already engaged in recycling-related businesses in New York City, and an additional focus group with representatives of community economic development organizations, conducted by Mimi Lieber of LAR Management Associates.

* Two conferences on "Economic Development Opportunities in Recycling," held on January 26 at the World Trade Center, and on May 26 at Brooklyn Union Gas headquarters.

* Two roundtable discussions on the development of commercial composting enterprises in New York City, co-sponsored with Brooklyn Union Gas; and one on expanding the use of locally-produced building materials with recycled content, co-sponsored with the New York Building Congress.

* Telephone interviews with executives of 20 additional companies.

The information thus gathered helped us to develop a coherent picture of recycling-related industries, both in New York City and elsewhere; to identify the issues they face; and to understand the factors that influence their growth and shape their location decisions.

While the report identifies a number of opportunities for recycling-related development in New York City, and suggests in broad terms how the city's waste management and economic development policies might best be shaped to take advantage of these opportunities, it does not present detailed recommendations for new program and policy initiatives. During the next few months, the Mayor's Interagency Task Force on the Development of Recycling Businesses and Markets will be presenting specific recommendations for legislative, regulatory and administrative action.

Outline of the Report

Section One of the report presents a brief overview of recycling activity in New York City, the economic context in which it occurs, and its relationship to economic development. Section Two provides an overview of recycling-related

industries; and suggests a way of segmenting these industries along several dimensions: the *type of activity* in which firms are engaged; the *stage of development* of various industry segments; and the *competitive advantages and disadvantages* that the New York City area presents as a location for various types of business.

Using this segmentation as a framework, Sections Three through Six summarize our findings about opportunities for development in four major sectors: collection, sorting and consolidation; brokerage services; value-added processing; and fabrication of new goods using recycled materials. Section Seven focuses in more detail on opportunities for innovation and new enterprise development in these four sectors.

Section Eight discusses opportunities for and barriers to expansion of small and mid-sized firms already engaged in recycling-related business in New York City; and Section Nine explores the role that community organizations can play in recycling-related development. Finally, Section Ten discusses the implications of our findings for New York's solid waste management and economic development programs.

Acknowledgments

This project would not have been possible without the support and cooperation of many individuals and organizations. Commissioner Emily Lloyd of the Department of Sanitation asked the Urban Research Center to take on the project,

helped define its objectives, and provided start-up funding. The New York Community Trust and the Robert Sterling Clark Foundation also provided financial support; and Anita Nager of the Trust and Margaret Ayers and Laura Wolfe of the Foundation actively encouraged and supported our work. New York Telephone and Browning-Ferris Industries also provided financial support. The Port Authority of New York and New Jersey hosted the January 1993 conference at the World Trade Center; and Brooklyn Union Gas hosted the May conference at its headquarters. The Port Authority printed the report.

Among the many colleagues who helped in various ways, we are especially grateful to Mark Burstein, Director of Economic Development, and Kate Beeby, Executive Assistant to the Commissioner, at the Department of Sanitation; Anne Dillenbeck of the Department's marketing unit; Michael Green of Brooklyn Union Gas; Elizabeth McGuinness and Gene Spruck of the Port Authority; Will Ferretti, Director of New York State's Office of Recycling Market Development; and Mitchell Moss and Linda Wheeler Reiss of the Urban Research Center.

The most important contributions of all, of course, have been those of the owners and executives of recycling-related businesses, managers of community-based organizations, environmentalists and others who have freely contributed their time, information and insight to the project. For whatever success we have had in presenting and analyzing the issues and opportunities they confront each day, they deserve much of the credit.

ONE: RECYCLING AND ECONOMIC DEVELOPMENT

Recycling-related businesses are already an important part of New York City's economy. And as recycling enterprises collect, process and make new products with an increasing share of the materials discarded by the city's households, institutions and businesses, their impact on the city's economy is likely to increase as well.

Recycling in New York City

As a formally organized public-sector activity, recycling is of relatively recent origin. Although the Department of Sanitation had earlier undertaken some limited efforts, it was not until 1988 that the state enacted legislation (the Solid Waste Management Act) requiring all municipalities to establish local recycling programs. Pursuant to this mandate, the City Council in 1989 enacted Local Law 19, mandating the establishment of a city-wide recycling program. The revised Solid Waste Management Plan approved by the City Council in 1992 committed the city to an ambitious recycling effort, with 40 percent of residential, institutional, commercial and industrial solid waste to be recycled or composted by the end of the decade.

The Department of Sanitation has used a number of different approaches to collection of recyclable material from its residential and institutional customers. The most

common pattern currently involves three separate collections -- for recyclable paper; for all other recyclables; and "regular" collection of all other waste. Material may be collected at curbside in plastic bags or bins; or, in the case of institutions and large apartment complexes, in large containers.

By June 1993, the DOS recycling program was collecting and delivering to processing facilities an average of 1200 tons per day of recyclable paper, glass, plastic and metal. By the end of 1993, the Sanitation Department projects, more than three million households and hundreds of institutions will be participating in the program; and in 1995 the program will be expanded to include a variety of other materials.

MATERIALS TO BE RECYCLED: 1993 AND 1995

1993	1995
Newspapers	*Mixed paper*
Magazines	*Clothing*
Corrugated cardboard	*Household textiles*
Telephone books	*Plastic film*
Catalogs	*Plastic bags*
Metal cans	*Other plastic resins*
Aluminum foil	
Glass	
Plastic bottles (PET and HDPE)	

Although these numbers are impressive, the program is in many respects still in its infancy. To reach its goal of recycling 40 percent of its municipal and commercial solid waste by the year 2000, New York will have to recycle or compost about 12,000 tons per day. Achieving this goal will require the rapid development of an expanded processing infrastructure, and the development of new markets for the city's secondary materials.

The New York Economy

New York City is working to expand its recycling program at the same time that it is striving to understand and respond to a series of wrenching economic changes. The most significant of these changes reflect broader trends that are reshaping not just the metropolitan area economy, but the entire world's as well.

As the global economy has become more and more integrated, New York's role in the world economic system has become more and more specialized. Increasingly, New York serves as *a center for the creation and sophisticated application of intellectual capital* -- for generating the ideas and information that shape the production of goods and services throughout the world. The products of the New York area's intellectual capital sector include the strategies devised in its corporate headquarters; the new products and processes developed in its corporate research and development centers; innovative financial products; new fashions in

apparel and accessories; new medical treatments; and the work of artists, architects, authors and playwrights. Hundreds of thousands of New Yorkers are employed directly in the production and application of intellectual capital, and hundreds of thousands more in the complex of sophisticated services that support the work of the city's intellectual capital industries.[1]

As New York's intellectual capital sector expanded during the 1980's, the city's role in *the routine production of goods and services* continued to shrink. Since the late 1960's, the city has steadily been losing routine production activity -- the manufacture and distribution of highly-standardized goods that compete primarily on the basis of cost, such as men's underwear and shirts, and routine financial operations such as the processing of insurance claims and credit card transactions. The shift of such activities to lower-cost regions of the U.S. and the world seems destined to continue.[2]

The evolution of its economy toward greater specialization in the creation and application of intellectual capital has on the whole been beneficial for New York. But there have been costs as well. Even though the growth of the intellectual capital sector has created new blue-collar jobs in areas like building services, hotel services, and air freight, the decline of New York's routine production sector has limited the range of jobs available to New Yorkers with limited education and limited skills. John Kasarda, for

example, has found that between 1970 and 1986 the city lost 510,000 jobs in industries where the mean level of educational attainment was less than twelve years, and gained 322,000 jobs in industries in which the average worker had at least some college education.[3]

The impact of this shift is aggravated by the geographic imbalance between job losses and gains within the region. Low-income areas in Brooklyn, the Bronx and Queens were often among those hardest-hit by the decline in routine production jobs. But the supportive service and local service jobs generated by the growth of the intellectual capital sector were often located either in Manhattan or in more affluent suburban areas. During the boom years of the 1980's, for example, employment in grocery retailing increased in the New York-New Jersey suburbs by 25 percent; in the boroughs outside Manhattan, by only 1 percent.

The severe recession of the past few years -- which has really combined the effects of a conventional business-cycle recession with the dislocations caused by longer-term changes in the structure of the local economy -- has aggravated some of the negative trends that were evident in the 1980's. The decline in routine production activity has accelerated; and many of the industries that had helped offset the loss of routine production jobs in the 1980's have slipped into decline as well.

The continuing decline in routine production is evident in the continuing loss of manufacturing jobs. Overall

manufacturing employment, after declining by a third between 1979 and 1989, dropped by an additional 18 percent between 1989 and 1992.

JOB LOSSES IN MANUFACTURING INDUSTRIES, 1989-1992
(thousands)

	1989	1992	Loss	% Loss
Lumber, wood	4.0	2.6	1.4	-35%
Furniture, fixtures	8.0	4.7	3.3	-41%
Stone, glass, clay	3.5	2.4	1.1	-31%
Primary metals	2.0	1.8	0.2	-10%
Fabricated metal prod.	13.7	10.7	3.0	-22%
Nonelectric machinery	8.3	5.9	2.4	-29%
Electric equipment	16.8	13.9	2.9	-17%
Transport equipment	3.2	2.9	0.3	-9%
Instruments	7.1	5.5	1.6	-23%
Food, kindred prod.	18.6	15.9	2.7	-15%
Textiles	16.0	12.0	4.0	-25%
Apparel	100.3	85.3	15.0	-15%
Paper, allied prod.	10.6	8.1	2.5	-24%
Printing, publishing	87.7	73.1	14.6	-17%
Chemicals, allied prod.	18.2	16.5	1.7	-9%
Rubber, misc. plastic	5.8	4.7	1.1	-19%
Leather products	5.9	3.5	2.4	-41%
Misc. mfg.	27.6	22.4	5.2	-19%
Total mfg.	359.5	293.1	66.4	-18%

(Source: NYS Department of Labor)

The fact that routine production activity will continue to decline does not mean that it will disappear from the city. There are some niches within which small manufacturing firms can survive and even flourish. Some financial institutions and service companies will choose for various reasons to keep routine processing activities here, even though they might be performed elsewhere at lower cost. New York's future may increasingly be linked to its competitiveness as a center of intellectual capital; but the human and social costs associated with the decline of routine production make it imperative that the city also strive to retain and develop routine production activity, wherever it is feasible to do so.

Why Recycling-Related Development Is Important for New York

It is against this background that New York City has begun to explore opportunities for recycling-related economic development. There are several ways in which the development of businesses that process and re-use materials now included in the city's waste stream can help New York meet the economic challenges of the 1990's.

First, *recycling creates new opportunities for business and job development*. As a result of both the economic advantages of recycling and the legal mandate to recycle, new business opportunities will be created in the collection, consolidation and trading of waste material; in processing it to make commercially useful industrial commodities; and

in the use of those new commodities to make new goods. Firms that take advantage of this opportunity could create thousands of new jobs -- many of which would be suitable for people with limited skills and limited work experience.

Second, *the areas in which recycling-related businesses are most likely to develop include a number of communities that the boom years 1980's passed by, and that are most in need of economic renewal*. These include the Hunts Point and Port Morris areas in the Bronx, Red Hook and East Williamsburg in Brooklyn, the northwest shore of Staten Island, and Maspeth in Queens.

Third, *many new recycling enterprises will be able to help other New York businesses reduce their waste disposal costs, and in some cases their raw material costs*; this will enhance New York's ability to sustain within the city routine production and local service businesses, for which these costs might be a serious disadvantage.

Fourth, *the successful development of recycling-related businesses can over time help reduce the cost of the city's own solid waste management program*. As markets for more materials are developed, the city will be able contain the growth of its collection and disposal costs -- and in some cases, may begin to generate revenues for materials it has heretofore paid to get rid of.

Finally, *an expanded recycling program can help improve the quality of the city's environment*. Although this may be a less tangible benefit than the others we have cited, it

can help make New York a more attractive place to live, work and do business. Such "quality of life" factors can have a significant impact on the location decisions made by firms in the intellectual capital sector.

TWO: OVERVIEW OF NEW YORK'S RECYCLING-RELATED INDUSTRIES

To realize the potential contributions that recycling-related industries can make to the revitalization of New York's economy, we need to understand *which recycling industry segments* represent the most significant opportunities for development in the New York area. Just as important, we need to understand the *underlying characteristics* that make those segments promising candidates for development in New York.

To do that, we need to start with a way of segmenting the wide array of businesses involved in the recycling process -- in effect, a "taxonomy" of recycling. There are of course any number of ways to divide up the recycling universe. It is not a matter of defining which is in some sense "correct," but rather of finding one which is *useful* for our purposes.

For this analysis, we will begin by segmenting recycling-related industries along two dimensions:

* the *type of activity* in which they engage; and
* the *stage of development* of the industry.

Each of these is discussed in the following pages

Types of Activity

For purposes of this project we have defined four types of activity in which recycling-related businesses engage.

The first is *collection, sorting and consolidation*. This involves collection of material from waste generators, transporting it to central processing facilities, sorting it according to a variety of criteria that determine its suitability for reuse, and consolidating it for shipment. This is the world of commercial waste haulers, transfer stations, and commercial processing centers. It also includes non-profit organizations that run a variety of small-scale, community-based programs for collecting materials that the Department of Sanitation does not routinely pick up. (It could also encompass the Department's own recycling activities; but given our primary focus on economic development, rather than waste management per se, we have chosen not to include them in our analysis. We do, however, include the activities of private companies that provide processing services under contract to the Department.)

The second of our four activities is *brokerage*. This is the work of the intermediaries who help make markets for recyclable material by buying from those who collect and consolidate it and selling to those who use it; or by arranging a direct sale from one to the other. Very often, firms that are involved in collecting or processing material also do some brokerage. But to the extent that brokerage is purely a *trading* activity we view it as distinct from the physical handling and processing of the material. There are,

moreover, some brokers who literally never touch the materials in which they trade.

The third type of activity is *value-added processing*, which involves the physical alteration of the material in a way that makes it more valuable to manufacturers or other end-users. Examples include making pulp from various types of recovered paper; shredding and densifying steel scrap for use in making new steel; and converting used plastic bottles or stretch-wrap into the flakes or pellets that makers of plastic products use as feedstock. Some firms that sort and consolidate waste material also engage in value-added processing; and some manufacturers prefer to do their own processing. But there are also firms whose sole business consists of value-added processing.

The last of our four activities is *fabricating* -- the use of recycled material in the manufacture of new products. Recycled materials are used in a wide variety of industries. Among the most notable are paper products; fabricated steel products; and a limited but growing range of plastic products. In many discussions this type of activity is called "end-use manufacturing;" but we have chosen to use the narrower term "fabricating," simply to highlight the fact that much of what is done in the value-added processing sector should also be considered manufacturing.

Stages of Development

Recycling-related industries can also be divided along a second dimension -- the stage of development of the industry. For purposes of this project, we have defined three such stages.

Mature industries are characterized by generally stable demand (ranging, say, from gradually declining to growing slowly); stable patterns of production, distribution and competition; and limited opportunities for new entrants. Examples include the scrap metal business, the making of reprocessed textile fiber from used clothing, and the manufacture of glass bottles.

Emerging industries, at the other end of the spectrum, are those that are not yet well established. The commercial viability of their principal products and processes might not yet be proven. New technologies (or new applications of existing technologies) may be evolving rapidly. Patterns of production, distribution and competition may still be in flux, and barriers to entry relatively low. Examples include composting food waste from restaurants and supermarkets to make high-quality soil products; and using recycled glass, paper and plastics to make a variety of innovative building materials.

Transforming industries can be thought of as standing between these two extremes. They include relatively new industries that have moved beyond the emerging stage, and are now clearly viable commercially -- but in which demand

is still growing fairly rapidly (or has the potential to grow rapidly), and patterns of production, distribution and competition are still fluid. Examples include the operation of MRF's, and pelletizing film plastics.

It should be noted that the transforming industries do not consist solely of those that have just recently emerged, or that are only beginning to mature. Older, well-established industries can also "de-mature." That is, new developments can occur in older industries that destabilize long-standing patterns of production, distribution and competition, and create opportunities for new entrants.[4] In the 1970's, for example, the advent of "minimills," making steel entirely from recycled scrap in small, highly efficient electric arc furnaces, completely redrew the competitive map of the American steel industry. More recently, the "recycling ethic" (and in some cases the mandate to recycle) has created new opportunities for the production of newsprint from recycled papers. Some of the most significant economic development opportunities, in New York City and elsewhere, will occur in these "de-maturing" industries.

We can combine our four types of activity and three stages of development into a two-dimensional table, such as that depicted on the following page. Before proceeding with our assessment of economic development potential in these various segments, however, we need to consider a third dimension of our analysis.

	MATURE	TRANSFORMING	EMERGING
Collection Sorting Consolidation			
Brokerage			
Value-added processing			
Fabrication			

The Sources of Local Competitive Advantage

Each recycling-related industry segment is characterized by a set of competitive factors and locational requirements that may or may not be consistent with the advantages of a New York area location. Examining the characteristics of each segment can thus help us determine which ones offer the best prospects for development in New York.

The disadvantages of a New York location are all too familiar. Most of them are cost-related. Industrial land is significantly more expensive in the city than it is on the fringes of the metropolitan area, or elsewhere in the Northeast. The cost of constructing an industrial building can be about a third higher in the city than in upstate New York, and more than 50 higher than the cost of building in the Southeastern states. For most businesses, electric power is 50 percent more expensive in New York than in northern New Jersey, and double the cost of power in the Southeast. The high cost of living in the city can also make it difficult to attract skilled workers.

The city presents other disadvantages as well. Restrictions on air and water emissions may make it very difficult to site certain types of facilities in the city. And suitable sites for large-scale production facilities -- requiring, say, 20 to 50 acres -- simply may not be available.

Despite these problems, New York can offer other advantages as a location for certain types of activity. One source of advantage is *concentration of supply*. Some businesses -- textile recycling, for example -- need a large population base to generate enough material to meet minimum scale requirements. For such businesses, the center of a major metropolitan area offers real advantages. As one New York City textile processor notes, "You're not likely to see people in this business relocating to Sioux Falls."

A second source of local advantage is *market concentration*. A New York location may be advantageous to industries for whose products there is an especially strong local demand. This may be true of both recycled newsprint and office paper made from recycled stock.

Transportation costs can also be a source of local advantage. Where transportation costs constitute a significant part of the delivered cost of either a key raw material or a finished product, proximity either to the suppliers or customers can offer substantial savings. For example, the very high cost of transporting whole tires (relative to the value of the rubber they contain) argues strongly for locating shredding and crumbing operations close to the source of supply. Conversely, the relatively high cost of shipping newsprint can give a local producer of recycled stock an advantage over plants that are close to the traditional sources of virgin pulp, such as Canada and the Southeastern U.S.

Proximity to the metropolitan area's *marketing and distribution networks* can also be a source of competitive advantage. This is particularly true for those businesses that serve overseas markets, such as textile and steel scrap processors and scrap paper brokers. The New York-New Jersey port provides easy access and frequent service to all parts of the world.

Integration effects can also be a source of competitive advantage. A firm that already collects, sorts and consolidates several types of plastic resin might, for example, see some advantage in "moving up the value chain" into washing and flaking the material. Such a move might permit the firm to eliminate baling costs, reduce transportation costs, increase its net revenues per pound, and broaden the market for its materials. A company that is already processing material might, for similar reasons, decide to begin making a series of plastic consumer products. In either case, the advantages that local firms can derive from integration make New York a more attractive location for some activities that might otherwise locate elsewhere.

Less tangible, but also significant, are what might be called *cluster effects* -- the advantages that individual firms derive from being part of a community of businesses that are simultaneously sharpened by competition and strengthened by cooperation among themselves. This pattern is well known in fields like fashion and finance -- but it may occur in recycling-related industries as well. Scrap metal

processors, for example, might be competitors in much of their routine business. But one might also routinely send the other certain materials it lacks the capacity to process; one might occasionally help the other fill an unusually large order; and they might be partners in a new business venture.

In all of the business segments we have examined, New York, as might be expected, presents a mix of advantages and disadvantages. For example, the concentration of both supplies and customers that the New York area offers gives it some advantage as a location for making recycled newsprint; but high energy and construction costs weigh heavily against the city.

By combining our segmentation of recycling industries by type of activity with an assessment of the relative advantages and disadvantages that New York presents as a location for each industry segment, we can begin to draw a "map" of recycling-related industries, such as that which appears on the following page. Thinking of the broad array of recycling-related industries in this fashion can help focus our attention on those segments in which the city's growth prospects appear to be the strongest.

In the next four sections of the report, we will explore how the mix of local advantage and disadvantage affects the city's prospects in the four areas of recycling-related activity:

* Collection, sorting and consolidation;

* Brokerage services;
* Value-added processing; and
* Fabricating new products.

	MATURE		TRANSFORMING		EMERGING	
	No local advantage	Local advantage	No local advantage	Local advantage	No local advantage	Local advantage
Collection Sorting Consolidation		Transfer stations Textile waste processors Scrap metal yards		Commercial carters Commercial processors MRFs		White goods processors Building materials & fixtures recyclers
Brokerage	Scrap metal brokers Paper brokers		Plastic brokers			Recycled material exchange
Value-added processing	Detinning Aluminum smelting Steel mini-mills Textile fiber processing Hydropulping	Cullet grinding Steel shredding		PET flaking LDPE, HDPE pelletizing Rubber shredding and crumbing Fuel pellets		Tire pyrolysis Heavy metal vitrification Composting source-separated organics
Fabrication	Glass bottles Steel cans Aluminum cans Auto fabrics Sanitary products	Paperboard Furniture	Household plastic products Commercial plastic products Fiber glass	Newsprint Office paper Wallboard (varying materials)		Innovative building materials

THREE: COLLECTION, SORTING AND CONSOLIDATION

By far the greatest number of firms and workers engaged in recycling-related business in New York are those involved in the collection, sorting and consolidation of recyclable materials. This sector includes commercial waste haulers; transfer station operators; and firms that sort recyclable material from the waste stream and consolidate it for shipment to processors or end-users. Also in this category will be the firms that operate "materials recovery facilities" under contract with the Department of Sanitation. Finally, this sector includes a wide variety of other businesses -- such as scrap yards and textile recyclers -- that specialize in collecting discarded material, sorting it according to its potential uses and value, and consolidating it for shipment.

Commercial Carters

There are now about 285 companies licensed by the Department of Consumer Affairs to collect waste in New York City. (Some companies have more than one type of license -- for example, to haul waste and to run a recycling center). All together these companies serve about 125,000 businesses, and collect 11,000 tons of waste per day. In 1991 they collectively took in about $535 million in revenues from their customers within the city.

NEW YORK CITY'S LARGEST CARTERS
(By total 1991 revenues)

	Revenues	Customers	Trucks
Allied Sanitation	*$21.7 mil*	*3,060*	*33*
V. Ponte & Sons	*21.2*	*1,063*	*57*
Suburban Carting	*21.0*	*2,490*	*41*
American Med Waste	*11.7*	*691*	*17*
Lehigh Carting	*11.2*	*2,650*	*28*
Barretti Carting	*10.2*	*937*	*16*
Southside Carting	*10.1*	*1,028*	*20*
Baisley Park Carting	*9.4*	*345*	*6*

[Note: This list presents only the largest individually licensed companies. In some cases, a single family or other closely related group controls several licensed companies, and effectively runs them as a single business. Usually, however, such clusters consist of one large carting company and several much smaller operations. Aggregation of revenues among closely-related companies would consequently have little effect on the identity of the industry's largest players.]

(Source: Dept of Consumer Affairs)

The scale of commercial carters' operations varies greatly, from one or two vehicles serving fewer than a hundred customers to dozens of trucks serving thousands of accounts -- from $250,000 in revenues to more than $20 million.

Carters are not franchised to cover specific routes or areas. Once licensed, they are free to sign customers anywhere in the city. While in theory this should produce vigorous competition among carters, in practice it has not.

It has, however, given rise to a crazy-quilt pattern of overlapping routes and services.

According to DCA, for example, there were 95 different firms serving about 5,000 stops in an 85-block area of West Midtown in 1991. Half of these firms had ten or fewer stops in the area.[5] Many firms serve accounts that are strung out across several boroughs. From an overall system perspective, this approach to collection is inherently inefficient, and has fostered the maintenance of excess capacity in the carting industry.

During the past several decades the structure of the commercial waste hauling business, as described above, has been relatively stable. There have been few new entrants, and little head-to-head competition for accounts. Critics of the existing system, including DCA, allege that the carters have long maintained an informal cartel that protects the industry from competition, and keeps rates artificially high. (While the extent of such cartelization is difficult to prove, it is clear that many of the carters' customers believe that they have little real choice about which company collects their trash.)

DCA has proposed enactment of legislation creating a new regulatory framework that would attempt both to break up the cartel and to rationalize the provision of carting services. DCA's proposal would replace the Department's existing licensing system with one in which the city would be divided into districts, with a single company, chosen by

competitive bidding, responsible for all commercial waste hauling within a given district. DCA has to date made little headway against strong industry opposition to this type of restructuring.

The relative stability of the carting industry does not, however, mean that it has been immune to change. There have been several significant developments during the past few years. One major change was triggered in 1988, when the city increased the tipping fees that commercial carters were charged to deposit their waste at the Fresh Kills landfill, from $18.50 to $40.00 per cubic yard. The increase was intended to conserve landfill capacity, to promote recycling and to raise revenue; but the additional revenues did not materialize, as the carters shifted their business to landfills outside the city -- often hundreds of miles away. This shift in turn led to the proliferation of "transfer stations" -- sometimes sophisticated but often very crude facilities that consolidate locally generated waste for long-distance shipment.

New York State's Solid Waste Management Act and the city's Local Law 19 -- enacted by the City Council to comply with the recycling mandates contained in the state law -- spurred further changes in the industry. The new laws required New York City businesses either to separate certain recyclable materials from their trash, or to arrange for their waste haulers to separate these materials post-collection. Some carters were quick to offer separate col-

lection of recyclables; and some began to develop facilities for sorting and consolidating these materials as well. Others maintained single-collection systems, and developed facilities for post-collection separation and sorting. Many smaller carters, rather than develop their own facilities, chose to use those of larger companies, such as Star Recycling of Brooklyn. Finally, some carters continue to provide only the most limited post-collection services at rudimentary, poorly-maintained transfer stations.

The carting industry may soon be facing more far-reaching changes. In 1993, the Department of Sanitation promulgated rules requiring source-separation and separate collection of recyclables for all businesses in the city. The added cost of separate collection may drive some of the city's less efficient carters out of the business. To the extent that this permits consolidation of collection routes, and more effective utilization of commercial processing capacity, the overall efficiency of the system should increase.

The entry of major national firms such as Browning-Ferris Industries and WMX Technologies (formerly Waste Management Inc.) could also make the New York market much more competitive. The impact of these new entrants could go well beyond the accounts they actually serve, if their presence in the New York market encourages the more efficient local carters to compete more aggressively as well.

Over time, more extensive competition should translate into lower waste disposal costs for many New York businesses. Browning-Ferris, for example, has already had some success in signing up large commercial accounts in the city, at rates significantly lower than those charged by established local carters. The opportunity for customers to choose among competing carters may also have positive effects on the quality of the services they receive. An executive with one company asserts:

> *We think we can succeed in this industry by being one of the lowest-cost operators, but quality is also becoming more and more important. It may sound funny to talk about "total quality management" in the waste business, but during the next few years that will be the name of the game.*

Commercial Processors and MRF Operators

As noted above, several of the larger commercial carters have during the past few years made substantial investments in the development of facilities for sorting and consolidating recyclable material (many of them financed through the New York City Industrial Development Agency). Comments by executives of these firms suggest that they all saw recycling as "the wave of the future" in New York.

> *When the state law was passed, we saw the handwriting the wall. We knew that if we wanted to stay in this business, we had to become recyclers.*

> *Local Law 19 made us sit up and take notice. We had to decide what we were going to do. We knew the status quo couldn't continue. Staying in meant not only recycling, but having to upgrade the quality of collection.*

tires for use as fuel. (This type of activity will be discussed in greater detail in Section Five.)

The economics of commercial processing operations vary by the types of material involved. Higher-value materials can be sold; some can be given away; and some, operators must pay to get rid of. Finally, all commercial processing operations wind up with some residue of material for which there is no beneficial use, which must either be landfilled or incinerated.

The percentage of residue produced by different facilities can vary greatly, depending on the types of customers served, the types of processing equipment the facility has, and whether separation takes place pre- or post-collection. For example, a facility that mostly serves office buildings with good source-separation programs may be left with less than 20 percent residue; a facility that serves a wider array of businesses and provides post-collection separation may be recycling less than 20 percent of what it collects, leaving more than 80 percent to be landfilled or incinerated.

Sorting and consolidation operations are fairly labor-intensive. A 500-ton-per-day facility might employ anywhere from 70 to 120 people full-time. (A nationwide study of MRF operations conducted by the National Solid Waste Management Association in 1992 found throughput per worker in these facilities averages about 5 tons per day;[6] since most of New York City's capacity will be in newer, larger facilities, it

* **How the business works.**

Commercial recycling centers in the city typically receive material collected by affiliated carting companies -- and they frequently take material as well from other, smaller companies that do not have their own processing capacity. The waste delivered to these facilities is usually weighed, "tipped," and sorted by type and quality. In most cases, recyclable material is sorted manually as it moves through a system of conveyors.

Some of the material-- such as plastic bottles, or mixed paper -- is then mechanically compressed into standard bales for shipping to companies that provide further processing, or use it as raw material in various manufacturing processes. Other material, such as mixed glass, may be shipped in bulk, to be used in applications such as glasphalt. Many of the larger facilities also engage in some further processing of their material -- for example, making wood chips from demolition debris, or shredding discarded

LEADING COMMERCIAL PROCESSING FACILITIES SERVING THE CITY

	Tons/day	Employees
Waste Management, Bklyn	*1,100*	*130*
Star Recycling, Bklyn	*2,000**	*400**
BQE, Bklyn	*600*	*120*
V Ponte & Sons, Hoboken	*850*	*200*

(Post-collection separation; includes non-recyclables)*

(Source: interviews with processors)

should be possible to achieve productivity levels of 7 tons per day or more.) Entry-level jobs in this sector require few skills, and typically pay $5.50 to $6.50 per hour. Fork-lift operators often are paid $9.00 to $10.00; and machine operators $14.00 to $17.00.

Facilities that sort and consolidate recyclables are in a sense hybrids of two businesses. They generate revenues

EMPLOYMENT TRENDS IN SORTING AND CONSOLIDATION

Employment in businesses that sort and consolidate secondary materials is generally reported under SIC code 5093, Scrap and Waste Materials. The category includes commercial processing facilities of the type described here, as well as more specialized scrap businesses, such as scrap metal yards and textile recyclers, that are described later in this section. After a period of gradual decline, reflecting the contraction of the "traditional" scrap business in the city, employment in this category began to increase again in 1988 -- apparently a reflection of the growth of the commercial processing business. According to the State Department of Labor, employment in scrap and waste material businesses in the city totaled 3,716 in 1991.

	Total NYC employment, scrap and waste materials
1981	*3,683*
1987	*3,082*
1991	*3,716*

from two very different sets of customers -- waste generators who pay tipping fees, and purchasers of recycled materials. Many operators recognize, however, especially as post-collection separation is being phased out and a higher

percentage of the material they take in must be recycled, that the sale of material will increasingly drive their business. The following comments are typical:

> *A MRF has to be run as a manufacturing facility. We're in the business of manufacturing industrial commodities.*
>
> *This business isn't about taking what people want to get rid of. It's about supplying what people want to buy.*

*** Building new capacity.**

Commercial facilities now account for most of the sorting and consolidation of recyclable material that now occurs in New York City. This is true not only of commercial waste, but of nearly all of the approximately 1200 tons of recyclables collected each day by DOS. The Department contracts with several processors to sort and consolidate paper. Several other processors handle metal, plastic and glass; the largest of these, Waste Management of New York, handles about 71 percent of the city's daily collections of these materials. (The lone exception to these arrangements is the 60 to 70 tons per day of city-collected material processed through the city-owned East Harlem Intermediate Processing Center, which is operated for the city by a Connecticut-based company, Resource Recovery Systems.)

As the city's curbside recycling program expands, the capacity to handle material collected by DOS will have to expand as well. The city's solid waste management plan calls for the construction of six new 500-ton-per-day "materials

WASTE MANAGEMENT: FROM CARTING TO RECYCLING

The Lostritto family has been in the waste hauling business in Brooklyn for three generations. During the 1980's, as a new generation began to assume responsibility for managing the business, they began to shift their focus from carting to sorting and processing recyclable materials. Today, Waste Management is one of the largest recycling enterprises in New York City.

The Lostrittos' five facilities now have the capacity to process 500 tons per day of newsprint, 400 tons of mixed paper, 300 tons of bottles and cans, 300 tons of residual waste, 10,000 tires, and 700 cubic yards of construction and demolition debris. As their operations have expanded, they have rehabilitated several vacant, deteriorating buildings, and now occupy 325,000 square feet of space. Their operations employ about 160 people.

A direct rail connection at its Williamsburg facilities allows Waste Management to reach a wide range of customers by rail. The company is now shipping materials to many sites in the U.S., to Canada and even to Mexico City.

The Lostrittos' growth strategy includes both horizontal integration -- encompassing a wider range of materials -- and vertical integration -- providing additional processing and building end-use markets for the materials. Waste Management is now a partner in a New Jersey composting facility; and it recently acquired Utility Plastics, an East New York company that manufactures traffic barricades and cones from post-consumer plastics. The Lostrittos plan to expand Utility's product line, and improve its competitiveness by more effectively controlling costs.

The Lostrittos are optimistic about the future of their business in New York City. They view the concentration of materials in the city as a major asset. Proximity to metropolitan area markets also enables them to work closely with their customers, and to adapt their products to customers' specifications. And while the cost of doing business may be higher in New York City, they say that by aggressively focusing on the efficiency of their operations they have been able to keep their processing costs below the national average.

recovery facilities," which would sort and consolidate recyclables collected by DOS. Resource Recovery Systems has been selected by the city to develop the first of these (at Fresh Kills, Staten Island) under a "design-build-operate" agreement. The second is slated to be developed at Erie Basin, on the Brooklyn waterfront. While the purpose of these city-sponsored MRF's will be much like that of their commercial counterparts -- sorting, consolidating and shipping recyclable materials -- the city intends their operations to be more complex and more sophisticated. The Department of Sanitation will expect its operators to sort materials into more discrete categories, and be more aggressive about maximizing recycling and minimizing residual waste. RRS, for example, expects to recycle 97 percent of the recyclable material it receives at the Fresh Kills MRF.

Some companies that have invested in the development of sorting and consolidation facilities have been critical of the Department's plans to develop city-owned MRF's. They claim that many of their recently-developed recycling facilities are operating well under capacity, and would provide a less costly, more readily-available alternative to new city-owned facilities. Comments from several of the executives who were interviewed or participated in our focus groups are typical:

> *We could do twice the volume we're currently doing in this facility.*

The capacity already exists in Brooklyn to handle all of the material the city says it would handle at Red Hook.

Why don't they give what's in existence a chance, rather than creating something to bypass what's already there?

How you view the private operators' assertions about the availability of existing capacity will depend in part on how you choose to define the term. There are certainly some licensed facilities that have the physical capacity to handle a higher volume of material. But in most of these cases, existing *building* capacity would have to be supplemented with substantial new investments in sorting, baling and other equipment, especially if existing commercial facilities were to begin processing the wide range of materials the city plans to have processed at its MRF's.

In some cases, moreover, the owners of existing facilities seem really to be speaking more of their entrepreneurial and technical capacity to provide what the city needs, rather than about existing but unused production capacity.

We are way underutilized. We stretch our day out to fill eight hours. We are greatly expandable. There's a lot of experience in how to work with the city, licensing, codes, etc.

It will take the city years to open a new MRF. We know we could have that kind of facility ready in six months.

Local companies are of course not alone in claiming the organizational and technical capacity to process larger volumes of the city's recyclable materials. The leading

national waste management companies also assert that they have experience in the development and operation of MRF's, and networks for marketing secondary materials, that neither the city nor local commercial processors can match -- as well as financial resources much greater than those of any local company. The city's recycling program, they say, could benefit greatly from the infusion of their expertise and their resources.

It is hard to disagree with the suggestion that the city should be taking advantage of existing capacity. But given the ambitious recycling goals set out in the city's Solid Waste Management Plan, it is not really a matter of choosing between more effective use of existing capacity and the development of new facilities. New York needs to do both.

To recycle 10,000 to 12,000 tons of residential, institutional and commercial material daily, New York will need sorting and consolidation capacity greater than that which the existing commercial processing infrastructure and the city's proposed new MRF's *combined* would be able to provide. While there is still room for debate about the right balance of public and private participation in MRF development, there should be no argument about the need to develop quickly several thousand tons per day of new processing capacity for both municipally and commercially collected materials. The city should be working on several fronts at once: using any readily-available private-sector capacity to

meet its immediate processing needs; encouraging the upgrading, and where feasible expansion, of the best of the existing commercial processing facilities; and expediting the development of new facilities.

The city needs to determine how best to use the expertise and resources of the commercial recyclers -- both local and national -- to meet the need for additional capacity. It will need to design business arrangements that make the most of the private sector's strengths -- technical expertise, entrepreneurial ability, market orientation, operating efficiency and flexibility, and financial resources -- while also recognizing the city's need to ensure the availability, reliability and efficient geographic distribution of sorting and consolidation capacity. Striking this balance represents one of New York's greatest challenges -- and greatest opportunities -- in recycling-related development.

Other Collection and Sorting Businesses

New York's "generic" municipal and commercial waste management systems are not the city's only avenues for collection, sorting and consolidation of recyclables. There are several other industry segments that collect and process secondary materials independent of these two major systems.

* **Scrap metal.**

Some of these segments represent mature industries, with well-developed markets and limited growth prospects. The city's eleven scrap yards, for example, handle several hundred thousand tons per year of steel scrap, from junked autos, demolition debris, home appliances, etc. Some of this material comes from commercial processors, whose waste contains varying amounts of scrap -- some from demolition contractors -- some from large public agencies like the MTA -- and some from "alley entrepreneurs" who make a marginal living picking up abandoned scrap. Wrecked, junked and abandoned autos are also a major source of scrap in New York.

Sorting and grading material to meet industry specifications or the needs of individual customers is at the heart of the scrap business. As the operator of one yard says:

> *Our job is to identify what comes in, figure out what it can be used for, consolidate it, and provide the buyer with a guarantee of quality.*

Some yards also do various types of value-added processing -- a topic that will be discussed in Section Five.

While worldwide demand for scrap remains strong, the city's economy, with its declining industrial base, does not generate the volume of scrap it once did. As of 1990, the five boroughs generated only 17 percent of all of the ferrous scrap generated in the tri-state metropolitan region.[7] Moreover, the trend in recent years has been to

concentrate scrap handling in fewer, more efficient yards. The business is therefore unlikely to grow.

*** Textiles**

Textile recycling is also in many respects a mature industry. As with scrap metal, the key to success in textiles lies in understanding the needs of many disparate buyers, sorting bulk material into packages of product that meet those needs, and providing an assurance of quality.

> *The basis for this business is simple. How well you sell depends on how well you grade. That means your people have to know what they're doing, and the work has to be closely supervised. We're selling a lot of different products into a lot of different markets. It's hard work. But if you're good at it, you can recover tremendous value.*

The growth prospects for textile recycling seem somewhat brighter than those for scrap metal. The demand for recycled textile fiber and industrial wiping cloths (which together account for about half the market for used textiles) is now static or declining. But the growth of third-world populations and economies in the years ahead should lead to increased worldwide demand for used clothing, which accounts for most of the remaining half of the market. Clothing is also the most lucrative part of the recycled textile business. While textile fiber might command only a few cents a pound, and wiping cloths only 6 or 8 cents, reusable clothing will bring 30 cents or more per pound.

CLOTHING THE DEVELOPING WORLD FROM GREENPOINT

For half a century, Trans-Americas FSC Inc. has been in the business of recycling used textiles. The company processes about 35 tons a day of used clothing and other post-consumer textiles in its 70,000 square-foot Brooklyn loft building.

What Goodwill and the Salvation Army reject, Trans-Americas buys, either directly from non-profit organizations but usually through brokers. Material is shipped to the company's Greenpoint plant from sources as far as a thousand miles away. There it is graded and sorted according to the value of the material and the demands of the customer.

The sorting and grading process begins on the top floor of the building. As the sorting progresses, material is dropped through a series of floor chutes, and sorted yet again. By the time it is ready for baling and shipping, what started out as undifferentiated bulk material has become more than a hundred specifically graded products. About 45 percent of Trans-America's output is re-sold as clothing; the rest either becomes wiping rags or is shredded for use as recycled textile fiber.

Trans-America employs about 75 people. The company pays a combination of base wages and productivity bonuses. The base for entry-level workers is set at the minimum wage; and for higher-level workers it rises to $350 to $400 per week. Productivity payments can increase these wages by as much as 50 percent.

The used clothing market is unusual among recycling markets in that demand far exceeds supply. "I can sell a sweater in Pakistan for 15 cents, or a pair of pants in East Africa for 35 cents," says Trans-Americas president Ed Stubin. "That's cheaper than sending a letter." But Trans-America cannot access enough supply to meet current demand. Stubin hopes to work with the city and with community groups to generate more material locally.

Ed Stubin is painfully familiar with the costs of doing business in New York. But the advantages New York offers, as well as his own commitment to the city, keeps Trans-America rooted here. "I love this city," he says. "It would take a lot to make me move."

Moreover, while most of the scrap metal generated in New York already finds its way into the recycling stream, the same cannot be said of used clothing. The non-profit collection networks that in many communities keep most old clothes out of the municipal solid waste mix are much less extensive in New York. As a result, more usable material simply gets thrown away.

By recycling a higher percentage of its discarded clothing, New York could help meet growing worldwide demand. If New York City, for example, could divert out of the municipal waste stream a quarter of the 350,000 tons of clothing and household and institutional textiles that DOS collects annually, it could greatly increase the volume of material available to local processors for marketing overseas.

The textile recycling business also seems to fit well with some of the advantages New York has to offer. As a highly labor-intensive business, it needs access to a steady supply of trainable (although not highly skilled) workers. It needs easy access to a port, and to information about overseas markets. And it can operate comfortably in older, multi-story industrial buildings.

* Other specialized collection systems.

Businesses like scrap metal, textile recycling, and collection and disposal of discarded tires have a long history in the city. But other collection and processing

businesses are of more recent origin. After New York enacted legislation mandating the collection of deposits on beverage containers, several new companies were created that specialize in collecting bottles and cans from retailers and distributors, and sorting and consolidating them for shipment to processors or manufacturers. Because the returned containers are not mixed with other types of refuse, they are an important source of clean, high-quality recyclable material for the plastic, glass and aluminum industries.

A key to the success of specialized collection enterprises -- whether old ones like textile recycling, or new ones like handling of deposit bottles and cans -- is that they deal in materials that can readily be separated from -- and ideally, never even enter -- the "generic" municipal and commercial waste streams. Not handling these materials as "garbage" helps preserve their value, and helps assure that they can profitably be recycled. There are a number of other segments -- from the collection of discarded tires to the recycling of used computer parts -- in which the creation or further development of specialized collection and sorting systems could contribute both to the achievement of the city's recycling goals and the creation of new businesses and jobs.

Development Opportunities

The collection and disposal of commercial and industrial waste in New York City was for many years dominated by

MINING THE METROPOLIS

As New York's bottle deposit legislation took effect a decade ago, Henry Waxman, a sales manager for Alcoa, saw an opportunity to develop a bottle and can collection and processing business, serving retailers and beverage distributors. When Alcoa turned down Waxman's plan for developing the business, he moved to New York City and started Metropolitan Mining with just $5,000 in cash.

Initially, most of the city's bottle and can redemption market was controlled by ENVIPCO, a supplier of the now-familiar "reverse vending machines" that was allied with the city's major bottlers and distributors. Waxman first built his business by serving smaller bottling companies and supermarket chains. A partnership with a European manufacturer of reverse vending equipment subsequently helped Metropolitan Mining expand its market.

The company has since begun to develop its own sorting equipment, and has introduced a new service, called "SortAfter," that takes the burden of sorting bottles and cans off small store owners. It has even begun to collect bottles and cans from the cruise lines that call at Manhattan's passenger ship terminal. Last year MetroMining collected, sorted consolidated and shipped about 16,000 tons of plastic, glass and aluminum via its Maspeth processing center.

As a result of a grant from the New York State Department of Economic Development, Metropolitan Mining developed a machine, designed to be used in apartment buildings and similar settings, that color-sorts and crushes glass bottles. By keeping the glass color-separated, this equipment would help maintain value that is usually lost when bottles are commingled and compacted during the conventional municipal collection process. Waxman recently concluded an agreement to begin a large-scale pilot test of this equipment in two large apartment complexes.

a well-entrenched, stable group of companies -- a group that some critics have characterized as a cartel. But the city's waste management industry has for several years been in the

midst of a far-reaching transformation -- a process that the expansion of the city's recycling program will accelerate. This transformation will give rise to new opportunities for development in commercial carting, in sorting and consolidation of recyclables, and in specialized collection systems.

* **Commercial carting.**

The commercial carting industry is likely to undergo two significant changes during the remainder of this decade -- continued consolidation as less efficient carters are driven out of the industry, and a significant increase in competition among both existing companies and new entrants. This will not "create jobs" in the conventional sense -- indeed, the result is likely to be an overall *reduction* in the number of people employed in collecting commercial waste. But it should ultimately lead to lower waste disposal costs and better services for many businesses -- and thus increase New York's attractiveness and competitiveness as a place to do business.

There are several ways the city can encourage increased competition and continued rationalization.

* The city should encourage experienced, well-qualified waste management companies that do not now serve the New York market, or who do so only on a limited basis, to compete actively for commercial carting business.

* The city should promote increased awareness of opportunities for competition, both within the industry and among its customers.

* The city can also encourage rationalization through consistent, rigorous enforcement of regulations in areas such as commercial source separation and transfer station operations.

* **Sorting and consolidation.**

While collection services must by their nature be provided within the city, there is no reason why sorting and consolidation *must* take place within the five boroughs -- as demonstrated by the fact that a substantial part of the city's waste, both municipal and commercial, is now processed elsewhere.

Yet as the need for sorting and consolidation capacity increases, it is in New York's interest to encourage the development of this capacity within the city, for several reasons. First, the development of sorting and consolidation facilities is likely to entail the creation of a significant number of new jobs. Adding to the city's existing processing infrastructure the capacity to sort and consolidate an additional 7,000 tons per day of recyclables would create about 1,000 new jobs, many of them requiring only limited skills. Second, as we will discuss in Section Five, the location of MRF's and commercial processing facilities can influence subsequent decisions about the location of other, higher-value-added types of processing.

New York should therefore seek to encourage the development within the city of capacity to sort and consolidate recyclable materials that is adequate to meet the goals of

its Solid Waste Management Plan. Given the pace at which recycling-related industries are evolving, it is not necessary -- and may not be possible -- to determine now just what form all of this new capacity should take. Some may be in MRF's that handle only material collected by the city; some may be in "merchant" facilities that process material from many sources; some may be associated with facilities for value-added processing or the fabrication of new products. The city should adopt a flexible strategy, aimed at encouraging the development of substantial new capacity, without locking itself into any one approach.

* The city should maintain land use, regulatory, economic development finance and tax policies that will foster private investment in new capacity -- both by commercial processors already doing business in the city, and by potential new entrants.

* DOS should adopt an approach to contracting for the processing of recyclables it collects that allows the city to make effective use of both private capital and private expertise in the development and operation of materials recovery facilities, consistent with the city's need to ensure the availability, reliability, and efficient geographic distribution of sorting and consolidation capacity.

* When contracting with commercial processors for processing of materials that it collects, the Department of Sanitation should seek to use the award of such contracts as an incentive for the development of high-quality capacity for the processing of commercial recyclables.

* **Specialized collection systems.**

The further development of specialized collection systems can provide opportunities for the creation of new business and new jobs. These systems include some of the

most labor-intensive of all recycling-related businesses; the collection, sorting and consolidation of an additional 100,000 tons per year of New York City textiles could, for example, entail the creation of 400 or more new jobs. In just the next five years, creation of new businesses and expansion of existing ones could create 500 to 1,000 new jobs in this sector.

Specialized collection systems can also enhance the effectiveness of municipal and commercial recycling, by helping to maintain the value of materials that can easily be degraded when commingled with other waste materials, or by handling materials that cannot readily be accommodated within the "generic" municipal and commercial collection systems.

There are several business segments that might offer opportunities for development, including:

* Development of community-based systems for collecting used clothing, both for charitable use and for sale to textile recyclers. (This opportunity is discussed further in Section Nine of the report.)

* Development of community-based systems for collecting discarded household appliances, and removing chlorofluorocarbons.

* Continued development of enterprises that collect materials such as color-sorted glass and clean pallet wrap before they are commingled with the generic waste stream.

* Further development of businesses that retrieve, refurbish and resell used building fixtures and materials.

* Establishment of regulatory and financial incentives for private collection of waste tires.

FOUR: BROKERAGE SERVICES

Brokers play an important role in promoting the productive use of recycled materials. By linking suppliers of such materials to those who want to buy them, they help make the market place work more efficiently. And although the brokerage sector does not present New York opportunities for new business development on the same scale as those found in collection, sorting and consolidation, there is at least one potential development opportunity that deserves the city's attention.

How It Works

The heart of any brokering business is simply finding people who want to buy something and connecting them with those who want to sell it. The process can take a number of different forms. Sometimes it involves arranging a sale from seller A to buyer B, in exchange for a fee or commission. Sometimes the brokers may temporarily take title to the material -- buying from A and later selling to B when the price is right. Sometimes the broker also serves as a factor -- paying A in advance of the actual closing of the sale, and taking an assignment of the sale proceeds in exchange.

Some companies that are engaged in sorting and consolidation, or in some type of value-added processing, also

engage in brokerage. This is fairly common, for example, in the recycled textile industry.

> *I do some brokerage -- just about everybody in this business does some. Typically it happens when somebody calls with an order, and I say, "I don't have any of that, but I know where to get it." I'll arrange the sale, and charge a fee. That goes on all the time. But it's not a big part of my business -- maybe five percent of my revenues.*
>
> *There are not many people in this business in New York who are pure brokers. There are a few, but they tend to be very small.*

Many scrap yard operators also do some brokerage business. One operator we interviewed suggested that for his company too, this was essentially a sideline.

> *We occasionally broker some material, but not much. We don't see ourselves as brokers. Because we're directly marketing scrap that we process ourselves, we're really in competition with major brokers.*

Another scrap yard operator, however, cited the growth of his brokering trade as an important factor in his ability to survive in New York City. A small company that processes PET bottles told a similar story:

> *Right now, I'm probably brokering three times as much plastic as I'm processing. I see our future as being in processing the material, but right now it's the brokerage side of the business that's keeping us alive.*

There are, of course, some firms that are pure brokers, in the sense that they do not physically handle or process any of the materials they are trading. They include metals brokers like Sogem, paper brokers such as the Koplik

Organization, and plastics brokers like Ursula Products. Some of these firms are primarily export traders.

As a center of international trade, finance and information services, New York City is in some respects a natural location for this business. But as with many other trade services, the revolution in information and communications technology in recent decades has largely freed the business from any locational constraints. As one scrap processor commented:

> *It makes sense for me to be located here, since I export most of what I produce. But brokering is a business you can do from anywhere. All it takes is a desk and a phone and a fax machine.*

Opportunities for Development

The growth of recycling efforts worldwide may create some opportunities for growth of the brokerage business. Recycling programs that lack the scale or sophistication to deal directly with large processors or manufacturers may choose to work through brokers. And in situations where the supply of recycled material is outgrowing the demand for it, communities of MRF operators may turn to brokers to help them unload excess material.

But in the long run, opportunities in brokerage may be limited by the preference of most companies and communities for more stable, long-term buyer-supplier relationships. For municipalities and MRF operators, such relationships offer greater predictability in the placement and pricing of their material. One commercial processor says:

> *We always try to work directly with mills, end users, rather than brokers. We're more interested in working with our customers to meet their specs, than in getting The highest price in the short run. We may not have long-term contracts, but we want long-term relationships.*

For processors and manufacturers, long-term relationships offer greater control over the cost and quality of their raw material. An executive with one of the Northeast's leading producers of recycled paper says:

> *We get almost all of our feedstock on fixed-price contracts of five years or more. We occasionally get some material placed through brokers -- but of the 300 tons a day we receive, it probably averages out to one ton a day. We think that both our interest and the municipalities' is in developing the best long-term relationship, not getting the best short-term price. That way, we can work with people to maintain the quality of what they're sending us. The last time we rejected a shipment from one of our long-term suppliers was nearly four years ago.*

Moreover, as noted above, brokerage is now a business "that can be done from anywhere." While some brokers may find it advantageous to be here, there appear to be few if any ways in which the city could exert any leverage over where this business is transacted.

There is, however, one area in which New York may have an opportunity for developing new business -- the development of exchange-based trading of recycled materials. Recycling advocates, as well as some traders of recycled commodities and public officials charged with development of markets for recyclables, have long hypothesized that establishment of a central exchange could make the market for

some recycled materials work much more efficiently. A joint working group of the Recycling Advisory Council and the Chicago Board of Trade recently stated that:

> *Collection, processing and end-use of secondary materials are all activities encountering substantial barriers to growth. These barriers are due in part to market uncertainties regarding the adequacy and reliability of supply for these materials, the consistency with which suppliers can meet consumers' quality requirements, and the price that such materials bring, now and in the future....One means for removing these barriers to growth is to provide an organized trading forum where uniform standards regarding product quality, weight and measure, contracts, product certification and arbitration prevail.*[8]

In April, 1993 RAC and CBOT agreed to undertake a demonstration project, financed by a grant from the U.S. Environmental Protection Administration, aimed at testing the feasibility and effectiveness of an electronic market for selected secondary materials. At least initially, the system would handle current cash transactions only -- not futures contracts. The system's objectives would be:

* To facilitate price discovery by buyers and sellers;
* To even out geographic disparities in pricing;
* To foster increased certainty regarding both the quantity and quality of supply and demand;
* To facilitate the adoption of universal specifications and standards for the selected materials.

The RAC-CBOT work group cited post-consumer PET and post-consumer glass as commodities in which the system might first begin trading.

While the RAC-CBOT project undoubtedly gives Chicago a head start in developing a recycled material exchange, it does not preclude the development of similar services here.

* The city should carefully monitor the progress of the Chicago demonstration project, and evaluate its implications for New York.

* The city should at the same time begin to explore with leaders of New York's commodities trading industry, and with both suppliers and buyers of secondary materials, the feasibility of establishing a forum for trading such materials under the auspices of one or more of the New York exchanges.