FIVE: VALUE-ADDED PROCESSING

Many of the materials that are sorted and consolidated by commercial processors, MRF's and other enterprises must undergo additional processing of some type before they can be used in the fabrication of new products or for other purposes. In this section we will explore opportunities for development of such value-added processing activities -- defined here as any physical alteration of secondary materials that enhances their value to fabricators or other end-users.

There are at least as many types of value-added processing as there are commercially useful secondary materials. Some of the most common are listed below.

Value-added processing occurs in a variety of settings. Sometimes it is done at the site where material is collected and sorted. For example, a scrap yard operator such as Hugo Neu, of Long Island City might shred ferrous scrap to industry specifications and sell it to steelmakers; and some MRF operators, like Resource Recovery Systems, have the capacity to turn waste glass into furnace-ready cullet.

Some companies that use secondary material in fabricating new products also do their own value-added processing. Wellman, which manufactures recycled PET products, generally buys baled material, and handles washing and grinding at its

VALUE-ADDED PROCESSING: A SAMPLER

* *Deinking and pulping old newspapers and other printed material for use in making paper products.*
* *Cleaning and grinding color-separated glass to make "furnace-ready cullet" for use in bottle manufacturing.*
* *Shredding and densifying ferrous scrap metal or steel cans for use in electric arc furnaces.*
* *"Detinning" steel cans to obtain a higher-grade material for steelmaking.*
* *Shredding or "crumbing" discarded tires, for use as fuel or in manufacturing rubber products.*
* *Pyrolytic or catalytic conversion of synthetic rubber tires into petroleum and carbon black.*
* *Shredding, washing and flaking PET for use in making plastic fibers and products.*
* *Shredding and pelletizing HDPE and LDPE from plastic containers and film.*

own facilities. Webster Industries pelletizes HDPE and LDPE for its own plastic bag-making operations, but also furnishes pellets to other manufacturers. And many companies that make paper products from recycled feedstock, such as Garden State Paper, do their own deinking and pulping.

Finally, some companies specialize in some type of value-added processing. Ponderosa Fibers, for example, specializes in supplying pulp from recycled paper to other companies that make paper products; and Bi-Metal Corporation specializes in cleaning, shredding and densifying used steel cans.

As the table below indicates, there are already a number of companies in New York that are engaged in value-added processing, either as their principal business or as part of a larger recycling enterprise.

VALUE-ADDED PROCESSORS IN NEW YORK CITY

Nicon Plastics	*Long Island City*	*Washing, flaking PET*
E. G. Plastics	*Sunset Park*	*Washing, flaking PET* *Pelletizing HDPE*
R2B2	*East Tremont*	*Grinding PET*
Hugo Neu	*Long Island City*	*Steel shredding*
EWG Glass	*Jamaica*	*Furnace-ready cullet*
Coletta Recycling	*Far Rockaway*	*Tire shredding*
Star Recycling	*Williamsburg*	*Wood chipping*
BQE	*Williamsburg*	*Wood chipping* *Wood fuel pelletizing*
Waste Management	*Williamsburg*	*Wood chipping* *HDPE pelletizing* *Tire shredding*

Processed Secondary Materials: The Potential for Growth

While the total volume of value-added processing activity in New York is still relatively small, there appear to be significant opportunities for growth in this sector. This is so for several reasons.

The first and most important reason is increased demand from fabricators and other end-users for more fully-processed, higher-quality material. Glass bottle manufacturers, for example, have repeatedly stated their desire to

increase their use of recycled glass as feedstock. Industry experience has shown that with higher inputs of furnace-ready cullet, glass furnaces can be run at lower temperatures. This translates into lower fuel consumption (2.5 percent less for every 10 percent increase in recycled content), lower maintenance expenditures, and longer furnace life. However, as the percentage of recycled glass in a plant's feedstock rises, its ability to tolerate even small amounts of contamination declines. Thus, the demand for furnace-ready cullet should continue to rise over the next several years -- but so will the quality standards to which suppliers of recycled glass are held.

The continued growth of the minimill sector, both in the U.S. and abroad, should also mean continued demand for high-quality scrap that is shredded and densified to industry standards for use in electric arc furnaces. Similarly, the economics of PET production favor the use of washed and flaked secondary material as feedstock.

The strong demand for certain processed materials -- and the prospect of potential demand growth for others -- makes value-added processing an attractive business for some entrepreneurs. One processor of steel cans notes that prices for cans that have been shredded and densified (or "nugget-ized") are consistently higher and less volatile than prices for bales of flattened cans. And perhaps even more important, the demand for the product is steady.

The key is that nuggets always sell; bales may not.

The strong demand for furnace-ready cullet also makes it attractive for glass processors to provide the careful sorting and grinding to manufacturers' specifications that this product requires. Says one glass industry representative:

> *If the processors aren't sorting and grinding now they soon will be. That's the way the industry is going. Frankly, you'd have to be pretty stupid to stay in this business providing anything but furnace-ready cullet.*

Of course, the economics of using recyclable materials will not always be so favorable. Many firms that pelletize recycled HDPE and LDPE, for example, have had considerable difficulty delivering their product at prices and in volumes that make it competitive with virgin resins. Two upstate New York companies have recently been forced to shut down recycled HDPE pelletizing lines, due in part to weak demand for the product.

Similarly, executives of two New York City commercial processing companies indicate that their investments in equipment that shreds wood waste into chips that can be used as boiler fuel has not paid off. One says:

> *All told, we put close to $4 million into wood chipping. It has been a very negative experience for us. We got caught up in the frenzy, only to find out there was no profit to be made.*

When the company started its shredding operation, customers were paying $22 per ton for wood chips. But as more suppliers entered the market, and demand declined -- especially with the shutdown of the Procter and Gamble plant at Port

Ivory, the region's largest consumer of wood fuel -- prices rapidly collapsed. The company is once again paying to dispose of wood waste.

But even in some of these more difficult markets, the demand for processed materials could rise to the extent that buyers are willing to pay a price premium in order to procure materials and produce goods with higher recycled content. This can happen if the purchasers of the material believe that their customers will pay a premium for "green" products -- or if federal, state and local governments begin to mandate (or establish preferences for) recycled content.

It should also be remembered that some value-added processing segments, such as HDPE and LDPE pelletizing, are still relatively young, and still evolving rapidly. Some of the early entrants in this business may have been too small (less than 10 million pounds per year in some cases) to attain the scale needed to be competitive, or to be of interest to manufacturers that need a steady flow and large volumes of material. A later generation of larger firms may have more success.

The youth of some value-added processing segments also means that they have not exhausted opportunities for improving productivity and efficiency. In the words of one plastics processor:

> *As far as technological maturity goes, on a scale of 1 to 10, if the leading virgin producers are at 10, then we're still only at 5 or 6. There's lots of room to improve productivity.*

Achievement of larger scale and greater efficiencies in production should help processors of recycled plastics compete more effectively with producers of virgin resins.

New York as a Site for Value-Added Processing

Given a generally positive outlook for the growth of value-added processing, how does New York stack up as a site for this type of activity? The city presents some clear disadvantages as a location for value-added processing businesses -- chiefly the same disadvantages of cost, crime, congestion and environmental constraints that affect many other small manufacturing enterprises. Yet in this sector, firms may find that a New York location offers some special advantages as well.

* **Integration advantages.**

The most important of New York's advantages may be those that can be reaped from the integration of commercial processing and MRF operations with value-added processing. Operators of these facilities, faced with the need to market a wide variety of secondary materials, may find in many cases that the marginal cost of an additional processing step is more than offset by the higher revenues (and more assured market acceptance) that result. Indeed, by integrating an extra processing step on-site (or at an adjacent site), the operator may also be able to reduce or eliminate some costs.

Adding the capacity to shred and densify cans, for example, might enable a MRF operator to establish more reliable outlets for the material, and to earn a few dollars more per ton than could be obtained for cans that had simply been flattened and baled. And by eliminating the need for baling and trucking, the operator might be able to reduce his operating costs as well.

Tom Rattray, associate director of packaging development at Procter & Gamble, suggests that similar economies can be effected through better integration of the pelletizing process with plastics collection and sorting. Based on a study conducted by P&G and Quantum Chemical, Rattray estimates that eliminating baling, unbaling and trucking and related costs could reduce the delivered cost of HDPE pellets by as much as 5 cents per pound.[9] With pellet prices in the mid-20's, a reduction in cost of that magnitude could have a dramatic impact on the competition between virgin and recycled resins.

* **Supply and market concentration.**

New York's attractiveness as a location in which to integrate collection and sorting activity with value-added processing is reinforced by the concentration of supply that it offers. One firm, for example, has recently inquired about sites for development of a 150-ton-per-day can-shredding facility. Running at full capacity, such a plant could absorb more than half of all the steel cans found in

COLETTA RECYCLING

The pictures that line the walls of Mike Coletta's office portray the origins of his business -- a small scrap yard that has been operating in the same Far Rockaway location for nearly fifty years. Over time, the company's emphasis shifted to tires; and in 1986 a separate tire company, Coletta Recycling Corp., was established. Coletta is still in the scrap business, but recycling rubber and steel from tires now represents 70 percent of the combined operation.

Coletta Recycling Corp. receives up to 6,000 tires per day from municipalities in Westchester County, Hempstead and other towns on Long Island, and the Hudson Valley; other sources include NYC Department of Transportation, the Department of Sanitation, and tire dealers and auto repair shops throughout the metropolitan area. Coletta generally does not pick tires up. Instead, customers arrange to have them trucked to Far Rockaway; and pay Coletta a fee (averaging about 70 cents per tire) for accepting the tires to be recycled.

The first step in the recycling process is to sort the tires. Those that are still usable are sold for reuse or retreading. The rest, Coletta shreds and granulates. The company's main product is a half-inch "chip," and it is planning to produce smaller sizes in the future.

Coletta Recycling Corp. currently sells its entire output to one buyer,which provides further processing of the material for use in rubberized asphalt and various rubber and rubber-plastic products. It opposes land-filling or incinerating tires on ecological grounds.

Mike Coletta believes that as new products are developed, more rubber will be recycled. The Far Rockaway facility could process several thousand additional tires per day. It recently began taking tires from the Department of Sanitation and other city agencies. Coletta also hopes to add more production shifts and purchase additional equipment that would enable the facility to turn out a more refined, higher-quality product.

the DOS waste stream. There are only a few metropolitan areas in the country that could generate enough supply within a concentrated area to support a plant of this size.

Supply concentration may also reinforce New York's attractiveness as a location for pelletizing operations. New plants in this segment of the plastics industry will probably have production capacities of at least 40 to 50 million pounds. In most locations, production on this scale would require drawing material from many sources over a wide area. But with DOS alone expecting to collect 110,000 tons of rigid HDPE and more than 300,000 tons of film plastics in 1995, the task of securing the 20,000 to 25,000 tons of material required to keep such a facility -- or even several facilities -- operating at full capacity could be made simpler.

A concentrated supply of raw material also enhances New York's attractiveness as a location for commercial composting activities. About 11 percent of all residential and institutional waste collected in New York City -- more than 1,600 tons per day -- consists of food waste; and about another 10 percent consists of yard waste and other organics. The commercial sector generates about 1,500 tons per day of food waste; and about 1,000 tons of other organics. There are opportunities here both for companies that provide large waste generators with on-site composting services, and for companies that operate larger, central facilities that can process as much as 250 tons per day.

AMERICAN SOIL

Composting food waste, grass clippings and other organic material has long been an integral element of solid waste management in many communities. But American Soil is one of only a few companies that has sought to make a viable business out of composting source-separated organics.

The company's Freehold, N.J. facility currently receives material from supermarket chains, food processors, and various other commercial sources. At $40 per ton for food waste and related paper, $20 for grass and $15 for leaves, its tipping fees are generally lower than the fees that carters and their customers must pay for disposal of such material at landfills or incinerators. The 12-acre facility will absorb approximately 30,000 tons of organic material this year; it employs three people on-site.

American Soil markets its soil products in an area ranging from New York City to Philadelphia. Its customers include farms, golf course operators, cemeteries, landscapers, garden centers, homeowners, local recreation and public works departments, and federal agencies. Products can be tailored to meet the buyer's needs. "For example," says American Soil president Rob Young, " a golf course might want some material that's been screened at two inches, some at three-quarters of an inch, and some as fine as an eighth of an inch. Some customers may want a different PH, or a different sand or clay content." Prices range from $7 to $40 per cubic yard, depending on the product and whether the customer wants it delivered.

American Soil is planning to open its second facility at an 11-acre site in Broome County, N.Y. Young believes there is a strong market both for composting services and for soil products in New York City as well. "We've sold a great deal of compost to New York City apartment dwellers. And the city's parks are just crying out for more organics," he says.

The cost of land in the city can present problems for commercial composters -- a 250-ton-per-day "in-vessel" composting plant would require a minimum of 6 acres. But composters' ability to generate revenues through the sale of

soil products should still enable them to charge lower tipping fees than most conventional disposal facilities, even after taking into account the city's higher land costs. Moreover, the transportation savings that can be effected when carters can bring large volumes of materials to local facilities, rather than to remote landfills, or to composting sites in Connecticut or New Jersey, should also help make composting an attractive alternative for commercial carters and their customers.

For example, higher land costs of $10,000 per acre per year in New York City would translate into an added cost of about $1 per ton at a 250-ton-per-day, six-acre facility. Given a $40 per ton tipping fee and savings of several dollars per ton in reduced trucking costs, composting facilities within the city should be able to absorb the higher land costs.

New York City is also attractive because of the strong market it provides for the enriched soil products that composting facilities turn out. Studies done for the Department of Sanitation project demand for such products in the New York area -- for parks, golf courses, cemeteries, nurseries, gardens, etc. -- ranging from 400,000 to 1 million tons per year by the end of the decade.[10]

These supply, market concentration and transportation cost advantages do not necessarily mean that development of commercial composting facilities within the city will be

easy. Community opposition could prove to be a serious problem in some parts of the city; and the cost of offsetting such opposition through additional investments in odor control equipment or in larger buffer areas between a facility and its neighbors could make the economics of commercial composting unworkable. Still, the advantages of a New York City location, and the contribution that commercial composting can make to achievement of the city's solid waste management goals, suggest that it should be part of the city's recycling-related development agenda.

* **Access to international markets.**

For some value-added processing operations, the easy access to international marketing networks that the New York area offers might also help to make it an attractive location. The ability to reach export markets through the New York-New Jersey port is one of the factors that makes New York a competitive site for metal-shredding operations. Hugo Neu, for example, exports more than 90 percent of the output of its Long Island City and Jersey City plants; and the proposed can-shredding plant cited earlier would also be geared to export trade. Overseas markets are also significant for a number of other processed secondary materials, including pulp and plastics.

FROM REFUSE TO RE-BARS: BI-METAL CORPORATION

Lucian Bielicki, founder of Bi-Metal Corporation, credits the success of his company to its patented "nuggetizing" process, which transforms post-consumer steel cans into raw material for steel minimills. Although it can accept material with higher levels of contamination (labels, food residue, etc.) than other can processing technologies, uses no water and emits no air pollution, Bi-Metal's process produces high-quality nuggets that it sells to mills both in the U.S. and abroad. "There's a false perception out there that recycling is just collection," says Bielicki. "The whole secret to making it work is to produce a high-quality product that has a ready market. If you don't, you'll fail."

Bi-Metal operates two plants, one in Niagara Falls and one in Suffolk, Va. Both plants are adjacent to "refuse-derived fuel" waste-to-energy facilities, where cans and other recyclables are separated from municipal waste before it is burned. Bi-Metal purchases cans for a base price, plus an adjustment for quantity and for the current market price of ferrous scrap. Its process does not require washing the cans or removing labels. The Bi-Metal process instead uses forced air to clean the material -- thus saving water and reducing discharges into the sewer system -- shreds it, and compresses it into nuggets a few inches in diameter. Each plant produces about 1,000 tons per month.

The company sells most of its product directly to U.S. minimills; about 25 percent of the output of its Virginia plant is marketed overseas through export brokers. The company guarantees the base price for material from the Virginia plant that will be received by the Southeastern Virginia Public Service Authority, which financed construction of the plant and leases it to Bi-Metal.

Bielicki and his sons, Mark and Tom, are currently exploring opportunities for development of a third plant in the New York metropolitan area. Besides the concentration of supply that New York offers, its ready access to export market also makes it an attractive site for can processing.

* **Site and structural requirements.**

The site and scale requirements of many value-added processing businesses may also make them more adaptable to a New York setting than are many other manufacturing industries. A new plant producing 40 to 50 million tons of plastic pellets per year, for example, would require a site of approximately three acres, and 60,000 to 70,000 square feet of floor space. A 150-ton-per-day can-shredding plant would also require about a three-acre site. In many of these businesses, "economies of scale" have more to do with intensiveness of throughput than with the absolute size of the plant. This makes them particularly attractive as prospects for development in New York -- a city with few large industrial sites, but many small ones.

Many value-added processing enterprises, moreover, require much greater investment in equipment than in buildings. One company that processes rubber from discarded tires estimates that development of a 100-ton-per-day pyrolysis plant would involve about $8 million in equipment purchases, but only $350,000 in construction costs. While the ratio of equipment to building costs will not always be this high, it will in many value-added processing businesses be high enough to reduce significantly the disadvantage posed by the city's high construction costs.

New York's Disadvantages

Value-added processing businesses considering a New York location still face a variety of difficulties. For some of the more capital-intensive businesses, such as a deinking mill, the city's high construction costs -- perhaps 50 percent higher than might be incurred in upstate New York, and nearly twice the cost of construction in the Southeast -- could represent a major disincentive to locating in the city. Other businesses might find it difficult to locate here because of stringent controls on new sources of air or water pollution.

*** High energy costs.**

High energy costs may also make a New York location disadvantageous for some value-added processors. Our

COST STRUCTURE OF THREE PLASTIC PELLETIZERS

	Percent of total cost		
	Firm A	*Firm B*	*Firm C*
Labor	*20%*	*40%*	*25%*
Energy	*40*	*30*	*25*
Materials	*15*	*15*	*
Capital	*5*	*5*	*
Other	*20*	*10*	*50*

(included in "other")*

(Source: company interviews)

* **A limited local customer base.**

For some value-added processing enterprises, the limited local customer base that New York offers may make it less attractive than other locations. A deinking mill that sold recycled pulp to other paper producers, for example, would not have many customers in the New York area. Even industries that have a stronger local production base may not be attractive to value-aded processors, if they appear to be in decline. The manufacture of fabricated plastic products, for example, has been a declining industry in New York for some time. Just between 1981 and 1991, employment in this sector declined by 42 percent. Some producers of recycled plastic resins may consequently prefer locations closer to their major customers, and with better prospects for developing new customers.

The significance of factors like energy cost and proximity to customers in determining the location of value-added processing operations is reflected in the results of a survey of plastics processors recently conducted by *Plastics News*. The survey found that proximity to customers and utility costs were the most important factors influencing decisions about relocation and expansion, ranking ahead of such factors as labor cost, taxes and economic development incentives.

interviews with firms that pelletize plastics found energy costs ranging from 20 to 40 percent of total cost, depending on materials and processes used and on location. In the context of vigorous competition with virgin resin suppliers, differences in energy cost of 2 or 3 cents per pound can be significant. This can make it difficult for New York to compete with locations that can offer electric power at 4 to 6 cents per kilowatt-hour.

ELECTRIC POWER COSTS: NEW YORK VS COMPETING AREAS
(Basic rates, cents per kilowatt-hour)

New York City (Con Ed)	*11.96 cents*
Long Island (Lilco)	*13.16*
New Jersey	*8.37*
Virginia (eastern)	*5.81*
Virginia (western)	*5.40*
Tennessee	*4.64*

(Source: annual reports)

New York does have some capacity to narrow the energy-cost disadvantage it suffers relative to many competing locations. Con Edison's area development rates, coupled with city energy tax incentives, can reduce electricity costs by 30 to 40 percent. Such discounts may not eliminate the city's cost disadvantage; but they may reduce it enough to let other, more favorable factors come into play.

PLASTICS NEWS POLL, JUNE 1993

What factors would be most important in considering relocation or expansion to another state? (Top answers by percentage of respondents.)

Proximity to customers	*45.9%*
Utility costs	*44.2*
Low state/local taxes	*42.1*
Labor costs	*37.9*
Favorable workers compensation rates	*32.6*
Financing or grants for construction, road or utility improvements	*21.1*
Right-to-work laws	*17.9*
Tax abatements	*17.9*
Favorable environmental and pollution laws	*15.8*
Quality of life	*15.8*

(Source: Plastics News, July 19, 1993)

Opportunities for Development

There are several reasons why New York City might want to focus some attention on the development of value-added processing businesses. First, the advantages derived from integration, from supply concentration and from access to international markets may be great enough to make New York a competitive location for the kind of commodity production that too often seems to have no future in the metropolitan area. And while the employment impact of these operations may in the near term be limited -- perhaps 500 to 700 jobs during the next five years -- value-added processing will

often generate higher-paying, higher-quality jobs than do the MRF's and commercial processors.

Moreover, the development of value-added processing capacity in the city, fed by the companies that collect and sort the city's secondary materials, will also help the city meet its recycling goals, and help reduce the cost of waste

ESTIMATED EMPLOYMENT IMPACTS OF SELECTED FACILITIES

	Capacity	Jobs
PET washing & flaking	*25 mil lbs/yr*	*80*
HDPE/LDPE pelletizing	*40 mil lbs/yr*	*70*
Can shredding	*150 tpd*	*15*
Composting	*250 tpd*	*16*
Tire shredding	*10,000/day*	*5*
Tire pyrolysis	*10,000/day*	*20*

(Source: company interviews)

disposal for city residents and businesses. One tire processor provided a striking (even if still hypothetical) example.

> *Right now, 75 percent of my revenues come from tipping fees, and 25 percent from the sale of the product. If I could take the processing here to the next stage, I could sell more rubber, at a higher price. I could wind up reversing those percentages. I could be taking tires at $20 per ton instead of $55 or $60. Eventually I could see the tipping fee going to zero. But even at $20, you could have a pretty dramatic effect on illegal dumping.*

To take advantage of this potential, the city should actively explore opportunities for development or expansion of value-added processing enterprises in a number of business segments. These include:

* Pelletizing recycled plastics (HDPE and LDPE, rigid and film).
* Shredding and densifying steel cans.
* Producing furnace-ready cullet from recycled glass.
* Shredding and crumbing waste tires.
* Composting source-separated food waste an other organic material.

Our findings concerning value-added processing have certain implications that the city should consider as it pursues these opportunities.

* To derive the greatest possible advantages from process integration, the city should wherever possible encourage location of value-added processing at or adjacent to MRF or commercial processing sites. When sites for new MRF's or commercial processing centers are being considered, both the city and the developers should take into account the availability of space for the addition of value-added processing activities.
* The economic advantages to be derived from integration, as well as opportunities to use existing land and building space, suggest that the city should also give special attention to encouraging and aiding firms already doing business in New York (commercial processors, specialized collection enterprises, etc.) to expand into value-added processing.
* The city also needs to focus on the needs of New York firms already engaged in some form of value-added processing in the city. Many of these firms are struggling to survive in a difficult market, and in a difficult local business environment. Retaining these businesses, and if possible helping them grow, should be a priority. (Issues affecting these businesses will be discussed in Section Eight.)

* For newer enterprises (including established firms setting up operations in the city for the first time), the city should consider the development of sites that are "pre-packaged" and pre-approved for these uses. Given that most value-added processors are small (often very small) businesses, and the ready availability of attractive locations elsewhere, the city should not expect these companies to take on the up-front costs in time and money, as well as the risks and uncertainties, inherent in the EIS, ULURP and other approval procedures.

* The city should also develop an overall strategy for helping energy-intensive value-added processing enterprises reduce their energy costs; and for reducing other costs over which the city might have some control, such as disposal of residual wastes.

* While most materials that go through value-added processing go to some industrial use, there are some commodities for which public procurement can help create demand. They include soil products to be used in parks and other public lands, and fuel pellets. The city should consider using its procurement process to help build markets for locally processed materials.

SIX: FABRICATING NEW PRODUCTS

The last link in the chain of recycling activity involves the use of secondary materials in the manufacture of new products. (In the recycling community, this is commonly referred to as *end-use manufacturing*; we have chosen to use the somewhat narrower term *fabrication*, to highlight the fact that value-added processing should also be considered a form of manufacturing.) The range of industries that use recycled materials as feedstock in making new products is quite broad. A list of some of the more significant among them appears below.

In many of these industries, and in others as well, the years ahead are likely to bring opportunities to increase the use of recycled material. And more specifically, there may be opportunities to increase the consumption by these industries of materials generated, collected and processed in New York City. But opportunities to develop businesses *in New York City* that fabricate new products from recycled material may be much more limited.

The fact that these opportunities are limited does not, however, mean that they are nonexistent, or not worth the city's attention. While recycling is unlikely to provide the basis for an industrial renaissance in the city, it *will* provide substantial opportunities for the development of new fabricating businesses in selected "niche" industries, and

FABRICATED PRODUCTS USING SECONDARY MATERIALS: A SAMPLER

* *Carpets and rugs*
* *Automotive fabrics*
* *Pallets and skids*
* *Reconstituted wood (e.g., particleboard)*
* *Newsprint*
* *Paperboard*
* *Paper boxes and containers*
* *Tissue products*
* *Stationery and envelopes*
* *Molded pulp products (e.g., egg boxes)*
* *Fabricated rubber products*
* *Plastic bags*
* *Plastic consumer products*
* *Plastic commercial products*
* *Plastic lumber*
* *Glass bottles*
* *Fiber glass*
* *Wallboard*
* *Structural steel*

perhaps for strengthening some existing industries as well. In this section we will describe some of the factors that limit opportunities for development of fabricating enterprises in the city; identify some specific industry segments in which the outlook for new development may be more promis-

ing; and discuss how New York might stimulate development of those industries in the city.

Limits on the City's Opportunities

There are a number of reasons why increased generation of recycled material, and even its increased use in fabricating new products, might not translate into new industrial

EMPLOYMENT IN SELECTED INDUSTRIES IN NEW YORK CITY

	1981	1986	1991	% Change
Carpets, rugs	*156*	*178*	*125*	*-20%*
Paper mills	*1,458*	*908*	*507*	*-65%*
Paperboard mills	*1,721*	*1,188*	*241*	*-86%*
Envelopes	*1,854*	*2,265*	*1,546*	*-17%*
Stationery	*401*	*244*	*207*	*-48%*
Sanitary products	*134*	*82*	*20*	*-85%*
Corrugated boxes	*1,740*	*1,536*	*916*	*-47%*
Food containers	*398*	*176*	*188*	*-53%*
Glass containers	*103*	*95*	*--*	*-100%*
Plastic products	*7,553*	*6,339*	*4,348*	*-42%*
Plastic & lam. bags	*	*	*929*	*
Fabr'd rubber prod.	*259*	*174*	*208*	*-20%*
Metal cans	*406*	*153*	*57*	*-86%*
Wire products	*150*	*54*	*57*	*-62%*
Fabr'd struc'l metal	*365*	*271*	*119*	*-67%*

(Not reported separately until 1988)*

(Source: NYS Department of Labor)

development opportunities in New York. The first is that many of the fabricating industries that use recycled materials are mature industries -- often with little or no production activity in the city -- in which the development of any significant new production capacity is quite unlikely. Increased availability of recycled material may lead to its increased use as feedstock; but in many instances it will not be difficult for existing producers to adapt to this change.

Thus, the outlook for increased use of post-consumer glass in glass bottle manufacturing is quite positive. But the existing array of bottle manufacturing plants can adapt their operations to higher levels of recycled content with relative ease. Moreover, the long-term shift from glass to aluminum and plastic beverage containers makes it extremely unlikely that any new production capacity will be built in the foreseeable future. As one glass industry representative bluntly stated:

> *The manufacturers are very concerned about having a steady supply of furnace-ready cullet. I think there is definitely enough demand to support more processing capacity in the city. But I cannot in my wildest imagination visualize any of these companies ever considering putting a manufacturing plant in New York City.*

A similar dynamic is evident in some other industries that use recycled inputs. The established users of recycled textile fibers -- for example, makers of automotive fabrics -- have long been accustomed to using secondary material in their production processes. There may be opportunities to

increase their consumption of recycled material; but there is no reason to expect that this would either increase the demand for their product or alter existing patterns of production.

Similarly, makers of synthetic carpets are among the largest users of recycled plastics. But the carpet industry now suffers from substantial excess capacity; prospects for any new development in this industry are dim.

There are other industries in which growth prospects are better; but whose site requirements and cost characteristics make prospects for their development in the city seem remote. Even though the sanitary paper products industry, for example, is in many respects a mature industry, its growth prospects are relatively favorable. Growth in the home-health-related segments of the market has been strong; and export growth has averaged about 28 percent annually since 1988. The U.S. Department of Commerce projects the real value of shipments of sanitary products to increase by about 3 percent annually during the next five years.[11]

But a favorable outlook for the industry as a whole does not easily translate into opportunities for development in New York City. Production of sanitary products is for the most part a highly-standardized, high-volume, cost-driven business -- characteristics not well-suited to New York's high-cost environment. Moreover, a 1992 survey by the Environmental Defense Fund found that the industry is much more likely to grow through incremental capacity expansion

at existing plants, rather than through development of new plants;[12] and there is no existing production base within the city from which the industry could grow.

It is true that many companies in the sanitary products industry -- already major consumers of recycled paper -- will be increasing their use of secondary material during the next few years; and that New York City can offer a secure supply of this material. But in this case an assured supply may not provide much leverage; the cost of recycled feedstock is a small part of the total cost of the product, and it is available in abundance. In this industry, concentration of supply does not provide a compelling reason to locate in the city.

That so many of the fabricating enterprises that might use the city's materials are unlikely to locate here should not come as a surprise. Almost by definition, most large-scale users of recycled material are commodity-based, mass-production industries. These are industries that either have never been located here, or have been steadily leaving the city for years. In contrast, many of the smaller-scale, higher-value custom manufacturing enterprises for which the New York area might still be an attractive location do not use the types of material that the recycling process yields. And some -- manufacturers of specialty glass products for scientific and medical uses, for example -- may have quality requirements that recycled commodities cannot meet.

Where the City Might Be Competitive: The Case of Newsprint

Although many of the industries that use (or are potential users of) the city's recyclables hold little promise for development in New York, there are some significant exceptions. In several industry segments, expansion of the city's recycling program might well open up new opportunities for development of new fabricating enterprises.

* *Supply concentration and transportation savings*

In contrast to what has occurred in the glass bottle industry, the increased use of secondary material in production of newsprint is having a significant effect on patterns of production. Historically, newsprint mills have located near the sources of their raw material -- the forests that supplied wood that could be turned into pulp. Much of America's newsprint is thus made at mills in Canada, in the Pacific Northwest and in the Southeast, and shipped hundreds of miles -- usually by rail -- to feed the operations of the nation's printing plants.

But the use of old newspaper as feedstock in the production of newsprint now makes it feasible to consider the development of newsprint mills in major metropolitan areas. Eliminating long-haul transportation between Quebec and the New York area can result in costs savings of as much as $40 per ton. Recycling mills are also able to operate on a smaller scale than virgin newsprint mills traditionally have. The reduced site requirements (and reduced traffic and

environmental impacts) of a 300-ton-a-day "minimill" make it feasible to locate these facilities even in densely-developed metropolitan areas.

For a recycling mill, moreover, a metropolitan location provides the population density -- that is, the density of newspaper readers -- needed to assure a steady supply of raw material. An executive of one company says:

> *There is a real advantage in having your supply close at hand. One of the main things a mill will look for in choosing a site is the ability to guarantee supply. [A rival company] just built a plant in [a small city in the Northeast], and they're having real trouble. On paper their costs were lower, but the supply of No. 8 [the highest grade of old newspaper] just isn't dense enough.*

In terms of the framework outlined in Section Two, the advent of recycling is shifting production of newsprint from the realm of mature industries to that of transforming industries; and the factors that determine its location are being redefined.

(The advantages gained by producing recycled newsprint in metropolitan areas do not mean that established producers are giving up this segment of the market. Canadian Pacific, Kruger, Daishowa and Spruce Falls have all built new deinking facilities at existing Canadian plants within the past few years, and Bowater has done the same in Tennessee. These companies look to reduce the cost of transporting old newspaper from their metropolitan markets to the mills by negotiating "backhaul" rates with the

railroads that carry the mills' finished product to metropolitan-area printing plants.)

The ability to secure adequate supplies of old newspaper has a qualitative as well as a quantitative dimension. Steady, long-term relationships with a limited number of nearby suppliers make it easier to work with them to maintain or upgrade the quality of the mill's feedstock.

Several industry trends are reinforcing the need to control the quality of feedstocks. First, as recycling programs have expanded, more and more of the mills' feedstock is coming from curbside collections, less and less from pressroom cuttings and overruns; one leading mill in the Northeast says 85 percent of its input now comes from commercial and municipal curbside collections. If mills are to maintain the quality of their product in the face of this change, they also need to control the quality of their raw material. Second, as their use of color printing increases, many newspapers are demanding a "brighter" grade of paper. Finally, the "buyer's market" created by the confluence of increased mill capacity and reduced demand has enabled newspapers to be more demanding about quality.

Industry sources suggest that the depressed state of the market will limit opportunities for developing new capacity during the next few years. (At $400 per ton, prices are now at 1980 levels.) But as overall demand rebounds, the pressure to increase recycled content should make the demand

MAKING NEWSPRINT IN THE SOUTH BRONX

Ponderosa Fibers of America is North America's largest producer of deinked market pulp from recycled paper. The 25-year-old, company operates four deinking plants -- in Memphis, Tennessee; Augusta, Georgia; Oshkosh, Wisconsin; and Santa Ana, California. Ponderosa sells its pulp to leading manufacturers such as Kimberly Clark, International Paper and Boise Cascade, and exports about 10 percent of its output.

In 1992, in response to a request for proposals issued by the Department of Sanitation, a newly-created Ponderosa subsidiary, Recycling Corporation of America, proposed to build a 300-ton-per-day paper mill in the South Bronx. The mill, located on a 17-acre site in the Harlem River rail yards, would make newsprint from 400 tons a day of old newspapers and magazines collected by DOS, for sale to New York-area printing plants.

The $260 million project involves construction of a 560,000 square-foot plant, and the installation of handling, deinking and papermaking equipment costing about $130 million. The plant is designed to accommodate expansion to 600 tons per day, as market conditions warrant. When fully operational, the plant will employ about 165 people, including about 130 hourly employees earning $23,000 to $25,000 per year. The South Bronx Overall Economic Development Corporation will help recruit and train workers from surrounding community.

Paper-making is an energy- and water-intensive business. The availability and cost of both resources have proved to be key issues in the development of the project. Ponderosa is working with the Department of Environmental Protection to use New York City's "gray water" -- water that has been discharged from the city's sewage treatment plants -- in its production process. "New York is probably the most expensive place in the nation to build and operate a deinking facility," says Ross Patten, who is managing the project for Ponderosa. "Helping companies get competitive rates on water and energy is a valuable incentive that the city can use to attract this type of industry."

Recycling Corporation of America and city officials are now in the final stages of contract negotiations. "It's been a long process," says Patten. "We've learned a lot about what's involved in undertaking a project of this size in an urban environment. And I think it's fair to say that the city has learned a lot too, about what they need to do to make it feasible."

for recycled newsprint particularly strong. The American Newspaper Publishers Association, for example, has set a "voluntary" goal of 40 percent recycled content in their papers by 1995. While compliance with this goal is by no means assured, the demand for old newspaper could still increase, if state governments enact recycled content requirements.

All of these factors have helped create the opportunity to develop a recycled newsprint mill in New York City -- an opportunity moving closer to realization as the city hastens to conclude its negotiations with Recycling Corporation of America for development of a 300-ton-per-day mill in the South Bronx. Similar factors may apply to other segments of the paper industry as well.

* *Capitalizing on market concentration*

One of the key factors in developing facilities for the production of recycled newsprint in the New York area is proximity to a concentrated market for the product. Market concentration may also a key factor in several other recycling-related fabricating industries that hold some potential for local development.

Businesses that supply a wide array of goods to the region's huge concentration of office-based industries are an important part of the city's manufacturing sector. In some industry segments, the shift from virgin to recycled material may result in changes in the shape of the industry

similar to those taking place in newsprint production. This may be true, for example, of mills that make various types of office paper. (The Department of Sanitation and the Economic Development Corporation are seeking to take advantage of the potential for development in this segment, among others, through the issuance of a "request for proposals" for development of facilities in the city that would use mixed paper recovered from the residential waste stream as feedstock in the manufacture of new products such as office paper.)

* *But disadvantages endure....*

The emergence of a constellation of factors favoring New York does not mean, however, that factors unfavorable to the city have disappeared. High energy costs and high construction costs are significant disincentives to the development of energy-intensive, capital-intensive industries such as paper mills. The disparities in the cost of electric power between New York and areas with which it competes were cited in Section Five; and as the table on the following page shows, New York's contract construction costs are a third higher than the national average, and more than 50 above the cost of building in the Southeast. (This differential is largely a result of higher labor costs; construction labor costs in New York are more than double those in some competing locations, such as Atlanta or Dallas.)

Even when such factors as reliability of supply and proximity to customers are critically important, production cost considerations are never absent. As one paper company executive says:

> *Sure, you have to be able to show you can meet the buyers' quality requirements. But after that, you still have to give the best price. From their point of view, the fact that we're 100 percent recycled is a nice extra -- but they're not going to pay more for it.*

High costs are not the only disadvantages faced by firms seeking to establish production facilities in the city. For example, the need to obtain offsets of any noxious air emissions, limited wastewater treatment capacity and the delays that can result from multiple permitting processes, can also be significant barriers to development in New York.

CONTRACT CONSTRUCTION COSTS: NEW YORK VS OTHER CITIES*

(Index: national average = 100)

Nashville, Tenn.	*84.1*
Richmond, Va.	*87.4*
Atlanta, Ga.	*87.8*
Albany, N.Y.	*100.1*
Trenton, N.J.	*105.0*
Philadelphia, Pa.	*109.4*
New York City	*132.2*

** Labor and materials only*

(Source: Means Construction Cost Index)

COST OF CONSTRUCTION LABOR: NEW YORK VS OTHER CITIES

Hourly wage plus fringes, March 1993
(Ratio to 20-city average in parenthesis)

	Atl	*Dal*	*20**	*Phl*	*NYC*
Carpenters	*17.77* (.72)	*16.37* (.67)	*24.74* (1.00)	*29.79* (1.20)	*40.31* (1.63)
Electricians	*22.36* (.77)	-- --	*28.95* (1.00)	*34.21* (1.18)	*44.10* (1.52)
Laborers	*11.17* (.56)	*11.75* (.59)	*19.87* (1.00)	*23.43* (1.18)	*31.49* (1.58)
Pipefitters	--	*19.85* (.67)	*29.44* (1.00)	*33.17* (1.13)	*44.13* (1.50)
Sheet metal wkrs	*21.21* (.76)	*19.80* (.71)	*27.80* (1.00)	*33.23* (1.20)	*43.61* (1.57)
Struc'l iron wkrs	*20.63* (.88)	*17.65* (.75)	*23.38* (1.00)	*34.71* (1.48)	*50.60* (2.16)

** Average of 20 U.S. cities*

(Source: *ENR*, 3/29/93; Appleseed)

The city also needs to recognize that communities just outside the city may be able to offer many or all of the same locational advantages, without the added costs and complications of building and operating a plant in the city. The following comments -- one from a producer of newsprint, the other from a boxboard maker -- no doubt reflect the thinking of many in the paper industry, and in other industries as well.

> *Being 5 miles away from my customers instead of 500 makes a big difference in this industry. But being 10 miles away instead of 5 makes no difference at all. There's really no particular advantage to being in the Bronx rather than in North Jersey.*

It certainly makes sense for us to be in the metropolitan area. But with all of the additional costs, I'm frankly not sure it would ever make sense to put a plant like ours in the city.

If the city wishes to exploit effectively the advantages of locating certain fabricating activities in the New York area, it should be prepared to ameliorate the widely perceived disadvantages of locating such activities within the five boroughs.

Building on a Local Production Base: Plastic Products

There may also be opportunities for development in the fabrication of plastic products for businesses in the region, as well as for local consumer markets. The plastic products industry is generally much less concentrated than most segments of the paper industry. There are some large firms (some independent, such as Rubbermaid, and some major producers of virgin resins, such as Mobil); but there are also thousands of small, geographically dispersed firms. This pattern is reflected in New York City, where in 1991 there were 191 firms employing about 5,400 people engaged in the manufacture of a wide variety of plastic consumer and commercial products -- plastic bags, plastic wrap, food containers, drum liners, molds, custom packaging, automotive supplies, credit cards, office supplies and many others.

Nationwide, the growth outlook for fabricated plastic products -- both commercial and consumer products -- is generally strong. Moreover, according to the U.S. Department

of Commerce, the strongest growth in the industry will probably occur not in mass production but in small-scale, flexible production of more specialized products -- a trend that might benefit New York.[13] And while consumption of recycled material remains low in many industry segments, it should increase over time as recycled plastics become more competitive with virgin resins.

Nevertheless, plastic product fabrication in New York has been experiencing a steep decline. Some of this is a consequence of the recession; and some no doubt is a result of the general difficulties that small manufacturing firms encounter in New York. But some of the decline is traceable to more specific structural changes. The decline of the city's food processing industry, for example, has meant an erosion of the local customer base of companies that make various types of plastic packaging.

DECLINE IN PLASTIC PRODUCTS EMPLOYMENT IN NYC

	'81	'83	'85	'87	'89	'91
Plastic prods.	*7,553*	*5,825*	*5,967*	*6,339*	*5,813*	*4,348*
*Plastic bags**	**	**	**	**	*1,102*	*929*

** Before 1988, included with paper bags*

(Source: NYS Department of Labor)

The advent of large-scale recycling may provide an opportunity to stem this decline. In the short run, the availability of an ample supply of recyclable plastic may

not be a source of advantage. But over time, if the city's value-added plastics processing capacity increases, and if this material can be priced competitively with virgin resins, then proximity to the "metropolitan mine" may become a source of advantage.

There may also be integration advantages to exploit in the plastic products industry. As sorters and value-added processors of plastics search for markets for their material, some may find it advantageous to begin fabricating their own product. Some may do so by targeting specific product lines and investing in new production capacity of their own; some may do so through acquisition; and some may do so through alliances with local manufacturers. Just since the beginning of 1993, New York has seen several examples of such forward integration.

* The purchase of Genesis Plastics, a fabricator of consumer products, by the owners of Nicon Plastics of Long Island City.

* The purchase of Utility Plastics by Waste Management of Brooklyn; Waste management is also planning to expand into several new product lines.

* Several joint ventures now under development that would pair local scrap dealers or processors with manufacturers of plastic bags, pails and other consumer goods.

Section Five of this report highlighted opportunities for developing value-added processing enterprises within the city. One of the benefits to New York of encouraging the expansion of this activity is that over time it may increase

opportunities for forward integration into manufacturing in plastic products, and in other industries.

Where the City Has Leverage: Building Supplies

In evaluating opportunities for recycling-related development, the city needs to consider whether and to what extent it is able to exercise some leverage over the development of a particular industry segment. The business of brokering recycled commodities, as we noted previously, is one in which a New York City location may provide certain advantages -- but nevertheless one in which city government has very little capacity to influence location decisions.

One industry in which the city does have some leverage is the production of building supplies using recycled materials. Many building materials are manufactured and marketed on a local or regional basis. Moreover, within the New York area, the city exerts considerable influence over the market, both through the building code and through its role in public construction.

In recent years a number of U.S. firms have begun to produce a variety of construction materials with recycled content. (Some examples are presented below.) But New York has until recently been slow to permit, let alone encourage, the use of recycled building products. The city's building code effectively precludes the use of many recycled products in New York City; and the procedures required for testing and certification of new products can be costly and time-

consuming. Not surprisingly, New York has not seen the kind of innovation in the fabrication of recycled building supplies that has occurred elsewhere.

There are probably several reasons why recycled products have to date made relatively little headway in the New York market. Building codes are inherently conservative regulatory instruments, in which the regulators' primary concern must be the safety and durability of construction. This conservatism is probably only heightened in the case of

SELECTED MANUFACTURERS OF RECYCLED BUILDING PRODUCTS

United Fibers	Benicia, CA Chandler, AR	Cellulose insulation	ONP	36 ktper year
Regal Industries	Carothersville, IN	Cellulose insulation.	ONP	36 ktpy
Suncoast	Rochester, NY	Cellulose insulation.	ONP	10 ktpy
Manville	Penbryn, NJ	Fiber glass insulation	20% p-c cullet	NA
Niagara Fiberboard	Rockport, NY	Cellulose fiberboard	ONP	12 ktpy
Riverwood International	Edenburg, VA Joliet, IL Natchez, Miss.	Perlite insulation board	25% ONP	60 ktpy 60 ktpy 140 mil ft.py
International Permalite	Florence, KY	Perlite insulation board	25% ONP	NA
Homasote	West Trenton, NJ	High-density fiberboard	ONP	80 ktpy
Louisiana-Pacific	Pt. Hawksbury, NS	Gypsum Fiberboard	20% ONP	210 mil sqft
Highland American	E. Providence, RI	Gypsum Fiberboard	20% ONP	150 mil sqft
Glass Aggregate Corp.	Grand Rapids, MI	Drainage systems	mixed glass	NA
Trimax	Ronkonkoma, NY	Plastic lumber	mixed plastics	NA
National Waste Technologies	Ronkonkoma, NY	Plastic lumber	mixed plastics	NA
Recycled Polymer Associates	New York, NY Pennsylvania Tennessee	Plastic lumber	mixed plastics	2 mil lb py

public construction -- for example, in determining what materials can be used in the construction of schools. In many public construction agencies, moreover, budget constraints have in recent years led to cutbacks in materials research activity. And to date there has been no consistent, organized effort even to disseminate information about recycled products that have been approved for use in New York.

There nevertheless may be significant opportunities for the city in this sector. The New York City Buildings Department's inauguration of a "self-certification" process has reduced sharply the time required for approval of new materials under the city's building code. And there is widespread interest within the city's construction industry in expanding the use of recycled materials.

The recycled building products industry, moreover, is still very much in the early stages of development. Patterns of production and distribution are not set. By encouraging innovation in this area (a topic discussed in the next section), by working with local manufacturers products to speed acceptance of their products under the building code, by using them more aggressively in public construction, and by promoting their use in the private sector, the city could do much to make New York a center of this emerging industry.

The city's Department of General Services has already taken such an aggressive approach in its exploration of the use of plastic lumber in marine construction. The Department is in the process of procuring a variety of recycled plastic

lumber products for use in the construction of a recreational pier at Tiffany Street in the South Bronx. (It is generally easier to introduce new materials in outdoor construction than in buildings.) Through this pilot project -- the largest plastic-lumber construction job yet undertaken in the U.S. -- the Department is aiming not only to test these products, but to help expand the market for them. While there are no firms that are now manufacturing within the city the products that are to be used at Tiffany Street, the Department hopes that by stimulating the development of the local market, it can help induce some firms to establish local manufacturing operations.

Opportunities for Development

This section has identified several industry segments involving fabrication of new products from recycled material that may hold some promise for development in New York. Based on projected employment levels for recently proposed projects, and employment patterns in industries such as plastic products and building materials, we estimate that recycling-related development in these segments could result in the creation of 1,000 to 1,500 jobs during the next five years.

It is also important to understand the reasons *why* certain types of fabricating businesses emerge as development opportunities, while others do not. While the city should move quickly to capitalize on current business

opportunities, it also needs continually to monitor trends and developments in recycling-related industries that might give rise to new opportunities.

Opportunities can arise both from the emergence of new industry segments, and from the "de-maturing" of old ones. Changes in technology, in feedstocks or in marketing strategies might, for example, lead at some point to creation of "minimills" in an industry segment such as sanitary paper products that is now dominated by a few large-scale plants. Foreign producers might seek to establish a highly visible presence in the U.S. market. Or the enactment of recycled content legislation might increase the advantage the city could derive from being able to aggregate large volumes of high-quality material. New York needs to be prepared not only to respond to such opportunities, but to anticipate them.

How might the New York City best take advantage of its opportunities for development of fabricating industries? The key is to tailor its approach to reflect the factors that make New York competitive in particular industries. For example:

* Where the ability to secure a steady, high-quality supply of material is critically important, the city should use its ability to aggregate and guarantee supplies of secondary material to stimulate the development of fabricating businesses -- just as it has done with newsprint production. The city should also take responsibility in these cases for increasing and maintaining the quality of the material it provides.

* The city should encourage and work with commercial and value-added processors interested in expanding into fabrication of new products. This should not require any major new economic development programs or incentives; but it may require working closely with local processors and manufacturers to tailor city support to specific situations.

* Just as General Services is now doing in the case of plastic lumber, the city should also be prepared to use its procurement process to help build markets for recycled products that are, or could be, fabricated locally.

* New York City and State should take care to ensure that its waste management, land use and other regulations do not unduly restrict opportunities for integration of processing and manufacturing activities.

* As with value-added processing, the city should consider development of "pre-packaged" sites, to help small fabricators avoid some of the delays associated with EIS, ULURP and other approval processes.

* Even in those industry segments in which it can offer significant locational advantages, the city should keep striving to narrow the cost disadvantages that manufacturing operations face in areas like energy and waste disposal costs.

SEVEN: FOSTERING INNOVATION AND NEW ENTERPRISE DEVELOPMENT

The preceding four sections have assessed opportunities for development in four recycling-related industrial sectors, defined by the type of activity in which firms engage. In each of these sectors, industry segments were sometimes described according their stages of development -- mature, transforming or emerging. In this section, we will further highlight opportunities to stimulate the development of new recycling-related enterprises in emerging industry segments, and how the city might take advantage of them. We will also identify opportunities for development based on process innovations in more established industries.

New Recycling-Related Enterprises

In New York and elsewhere, innovators and entrepreneurs are busy creating new products that make innovative use of all kinds of secondary materials. Recycled glass is being used in a variety of abrasives, in reflective paints, and in building products. Recycled paper is used in everything from wallboard to animal bedding. As processors of municipal and commercial waste search for new outlets for their ever-increasing volume of material, necessity is once again proving to be the mother of invention.

During the past two decades, promoting the development of new products and new enterprises has become a common

feature of many state and local economic development programs. In New York, the State Department of Economic Development's Office of Recycling Market Development has focused specifically on supporting the development of new uses for recycled materials. There are several reasons why New York City as well should focus on new product and new enterprise development as a major element in its recycling-related economic development strategy.

First, the matrix of human, technical and institutional resources needed for this type of development already exists in New York. Columbia, Polytechnic and other universities offer expertise in several related areas of science and engineering, as do a number of engineering consulting firms. Sources of start-up capital, legal expertise and other supportive services often required by new businesses are also available.

Moreover, the concentration of supply that New York City offers may make it easier for new companies to obtain the materials they need, both during the development stage and as they move into production. Strong local markets for many products can also make this an attractive location for start-ups. This is especially so if public procurement processes and regulatory processes can be used to help build markets for new products. The manufacture of innovative building products using recycled materials seems to be particularly ripe for development -- and as the preceding section noted, it is an industry in which the city can

exercise substantial influence, both through public construction and through changes in the city building code.

New York City can benefit in several important ways from new product and new enterprise development. Virtually by definition, patterns of production and distribution in emerging industry segments have not yet been firmly established. If the city can effectively promote the start-up of new industries here, its opportunities for capturing at least part of their subsequent growth increase correspondingly.

Businesses based on innovative uses of recycled materials can also make important contributions toward achievement of the city's waste management and recycling objectives. This is especially true of companies that create commercially viable (or at least beneficial) uses for materials that are now difficult to recycle -- such as tires, film plastics, mixed glass or certain types of industrial waste. Utility Metals Research Inc., a small Staten Island company, provides a particularly striking example of a new venture that may be on the verge of converting two "problem" materials into useful commodities.

Process Innovation

While the development of new products and new enterprises may be the more glamorous aspect of industrial innovation, New York City has a substantial interest in

UTILITY METALS: SOLVING A PROBLEM, CREATING A PRODUCT

Plating Systems Inc. is a small Staten Island firm that makes equipment and supplies used in a variety of metal finishing processes. During the past twenty years the company's CEO, Marty Borruso, has seen his New York City customer list grow shorter and shorter, as the city's plating industry, plagued by severe pollution control problems, continued its long decline. PSI survived by expanding its sales nationally and by exporting, but Borruso still felt compelled to find some way to help his embattled local customers. A few years ago he launched a new R&D venture, Utility Metals Research Corp., to help find solutions to the industry's problems.

Utility Metals is now developing a creative way to help reduce the high cost of disposing of the heavy-metal sludge that is a by-product of metal plating. The process uses a new application of an established technology -- high temperature vitrification -- to encapsulate the heavy metal waste in a glass material, which can then be used to make industrial-strength ceramic tile.

Utility Metals' process has already passed stringent testing requirements imposed by EPA to ensure that the toxic material cannot leach out of the product over time. The company is now doing large-scale testing of its vitrification process at a plant in Pennsylvania. If the test is successful, Borruso plans to proceed with the development of a pilot plant in New York City. The 25-ton-per-day plant would use heavy metal sludge, incinerator fly ash, and other metal-bearing and glass-forming materials to feed the vitrification process. Eventually, says Borruso, the plant could take not only the plating industry's sludge, but also make other metal-bearing waste materials recyclable.

recycling process improvements as well. Innovations that reduce the cost or improve the quality of secondary materials -- such as automated sorting of plastics by resin and

color -- could significantly expand the market for the city's recyclables, and make them a much more attractive resource for potential fabricators.

The city should have a particularly strong interest in any innovations that might make it possible to remove contaminants from relatively "dirty" material at the MRF or during value-added processing. For example, processes that enabled pelletizers of film plastics to tolerate somewhat higher levels of contamination could significantly expand opportunities for recycling materials that might otherwise wind up in the residual waste stream. The difficulties that New York's urban environment presents for any effort to preserve the quality of material by improving household waste-handling and municipal collection procedures make such process improvements especially valuable to the city.

Opportunities For Development

There are several ways in which New York City can foster both product and process innovation, and the development of new recycling-related enterprise.

* The policies under which the city disposes of its secondary material should permit DOS (or MRF operators, at the direction of DOS) to make limited amounts of material available at low or no cost for purposes of materials research, and for development of new products and processes.

* The city's procurement policies, as well as those of of state agencies and authorities, should also permit limited sole-source procurement of locally-manufactured products, when such purchases might help establish a market for products that create new uses for the city's recycled materials.

* The state's solid waste management regulations (Part 360) should be amended to make clear that DEC can use its simplified R&D permitting process not just for purposes of scientific research, but also for accelerated approval of pilot projects aimed at testing the commercial viability of new products and processes.

* The city should work with New York's financial institutions, venture capitalists, corporations with an interest in recycling, and the public pension funds to ensure the availability of both debt and equity financing for new recycling-related ventures.

* The city should also consider the establishment of a limited program of research grants aimed at fostering development of innovative products and processes, similar to those provided by the state's Office of Recycling Market Development; as an alternative, the city might press for expansion of ORMD's program, and promote more extensive participation by New York City companies.

* The city should support technical assistance programs aimed at helping firms that process the city's secondary materials, or use them to fabricate new products, to adopt process improvements appropriate to their particular businesses.

EIGHT: NEW YORK'S LOCAL RECYCLING BUSINESSES -- PROBLEMS AND OPPORTUNITIES

Previous sections of this report have highlighted opportunities for development of recycling-related enterprises in New York. At the same time, we have noted some of the disadvantages that New York presents as a location for such development -- especially for large, capital-intensive projects. We have also noted that firms making decisions about the location of new recycling-related plants often find that other communities in the region may offer all of the advantages of a New York City location, but at lower costs.

These findings serve to highlight one of the most frequently-recurring themes of the interviews, discussions and focus groups conducted during the course of this project -- the importance of small and mid-sized companies already doing business here as a prime resource in the development of recycling-related industries in New York. Many of these companies have already learned how to cope with the city's difficult business environment. Many have space available within which to expand. And these companies are often in the best position to reap the benefits that can be gained through integration of sorting, processing and fabrication activities.

However, our discussions with executives of local companies also revealed that while many of them are strongly committed to New York, they find the city to be a difficult place to do business. And they believe that government agencies do not fully understand or appreciate the problems they face, the contributions they make, or their potential for growth.

The concerns these business people express are not new; and not all of them are unique to recycling. In many cases they reflect the same problems that other small businesses have long encountered in New York City -- high costs, high taxes, congestion, fragmented government and public bureaucracies whose priorities are (often necessarily) shaped by needs and demands other than those of the business community.

Local recycling businesses, however, seem to experience some of these problems with particular intensity. Many of them operate in older, densely-developed neighborhoods where attitudes toward their operations, and to the possibility of expansion, are at best ambivalent -- especially where their operations generate noise, dust and truck traffic. Even those recyclers that do not produce such noxious effects can suffer from association in the minds of many citizens and public officials with the "garbage" business.

Recyclers must also deal with regulatory systems -- such as the city's regulation of land use, or the state's

We've been collecting paper in New York since 1919.

The city often acts as if recycling is something new. But we've been recycling for 75 years.

Even executives of newer recycling enterprises often cite their roots in the city.

I grew up in the city, so for me, starting this business was like coming home....My father was a career employee of the Housing Authority. I worked summers as a maintenance man in the projects. I know these neighborhoods.

Industry participants believe the depth of their experience gives them a knowledge of the business that neither government officials nor other "outsiders" can match.

We've been in this business [textiles] for fifty years ....This is a very complex business. We sell a lot of different products into a lot of different markets.... We ship all over the world. Prices can change daily, even hourly.

Everyone [in this business] knows their customers.... I know what he throws out, I know how much tonnage. I know what's in the containers. I know where it is.

Executives of New York's recycling enterprises believe that their roots in their neighborhoods help make their operations more acceptable to their communities than new operations started by outsiders would be.

My father started here in 1919. We're part of the neighborhood. People here know we wouldn't do anything that would hurt the neighborhood. We have excellent relations with our community board.

We've been in the same building since 1957. We employ a lot of people from the neighborhood. We don't have any problems.

regulation of solid waste businesses -- that have not yet been recast to reflect the growth and evolution of recycling, and its importance to the city. And because it is expanding, the recycling industry has been affected more than other, less dynamic industries by the new land use planning and development procedures that have dispersed governmental authority more widely among independently elected and appointed officials.

If New York is to realize the opportunities for recycling-related development described in this report, it must understand better the point of view of these local recycling businesses; find ways to address the concerns they express; and learn how to capitalize more effectively on their strengths.

Characteristics of Local Businesses

Among the images that emerges from discussions with representatives of New York's recycling businesses, one of the most powerful is their vision of themselves as deeply rooted in New York, and deeply rooted in the industry. Many of them are third-generation owners of tight-knit family businesses.

> *My grandfather started this business during the first world war....*
>
> *I used to take in newspaper for a penny a pound....I was actually doing source separated recycling.... Now I work with these same buildings to set up the recycling programs. I look at the elevator walls and say, "God, I was here 35 or 40 years ago." It's amazing.*

The chairman of the community board came to me and said "The city wants to put a recycling center here." I said "I know." And he said, "I'm gonna tell them if you run it, it's OK. If it's anybody else, forget it."

There are, or course, waste transfer stations and commercial recycling operations in many parts of the city that are not popular with their neighbors; and others that are tolerated, but whose expansion would not be welcomed. But the good community relationships that many of the more responsible recycling-related businesses have built up over the years can be an important resource for future development.

Participants in our discussions often cited their experience in managing New York's diverse labor force, and their success in providing jobs to people who might have difficulty being employed elsewhere, as an underappreciated -- and not easily duplicated -- strength.

I had a young woman from a city agency come here and start telling me about the incentives the city offers for hiring people released from Rikers Island. I didn't want to give here a hard time, because she was doing a good thing. But I said to her, "Hey, I get calls from Rikers all the time, and I take people. I've never needed a tax credit to do that."

We hire a lot of new immigrants. The pay isn't great, but it allows them to get started. And they get full health benefits, which they wouldn't get a lot of other places.

The city wants to bring in companies like [a major national firm] from outside the city. What kind of experience do they have with a labor force like this one? Are they going to be willing to work with people the way we do?

Many leaders of local companies also see themselves as committed to building the recycling industry in the city.

Many are actively looking for opportunities to introduce new services, and to get into the higher-value parts of the business. They say they are ready to put their own capital, expertise and "sweat equity" into new ventures -- and as described in Sections Five and Six, many of them already have.

> *We may be lean and mean, but we always leave ourselves room to do some R&D of our own. We think we can apply our expertise to a lot of different materials. And we already have the infrastructure.*
>
> *We're working on ten or twelve different innovations right now.*
>
> *We think there are more opportunities for making plastic products. We're investigating several right now....Everything we've done so far has been out of our own pockets.*

Some segments of the city's recycling industries also seem to be characterized by a pattern of "cooperative competition." Some scrap companies, for example, may compete with each other for some types of day-to-day business. But they may also share business back and forth when it is advantageous to do so. And firms may rely on each other for a variety of specialized services -- e.g. shredding steel for a commercial processor that doesn't have a shredder. Joint ventures are common. Some industry representatives suggest that this informal clustering of different firms with different capabilities is an important source of strength; and that it enhances the industry's ability to respond to new opportunities.

Problems Doing Business in New York

Many of the small business people who participated in our focus groups and discussion groups share what they describe as a strong commitment to the city, its neighborhoods and its work force, and to the continued development of the city's recycling businesses. But many of them also believe that city and state governments in general do not understand their business, do not recognize their expertise, and do not appreciate the role they can play in the development of recycling-related industries.

Some of this disaffection, especially among commercial processors, is a response to the city's plans to develop its own MRF's, as discussed in Section Three, rather than to rely on the purchase of processing services from established local companies. But it has other sources as well.

Executives of companies that provide services under contract to the Department of Sanitation, or have done so in the past, are particularly critical of the way the city does business.

> *The contracts are not really contracts. They can back out of them any time they want.*
>
> *Everything seems to be in their favor....They make no guarantees, and yet we have to promise our first and second born. The letter of the contract is very restrictive and potentially very damaging to business.*
>
> *When you do business with them, you get the feeling nobody is really in charge of the project. You have to deal with a lot of different people.*

With the city's recycling program still in the early stages of its development, it has probably been essential

for the Sanitation Department to retain a greater-than-usual degree of flexibility in its processing contracts. For example, until recycling became mandatory citywide in 1993, predicting the actual volumes of the materials to be collected was difficult; and in the absence of any prior working experience, the Department of Sanitation was reluctant to make anything more than short-term commitments to particular companies. The Department also sought to retain the flexibility to experiment with different approaches to collection and sorting, and to redirect material to take advantage of unforeseen economic development opportunities.

Many processors nevertheless believe the city has unfairly made them bear the burden of such uncertainties. They further suggest that the city's unwillingness to make firm commitments either on volume or on the duration of its agreements conflicts with the goals of getting private processors to invest in the upgrading of their facilities or in the development of new ones.

Despite these criticisms, many industry representatives recognize that the Department of Sanitation is committed to the recycling program, and believe that the Department is trying to be more responsive to the needs of business. But they also believe that other agencies of city and state government, while rhetorically supporting recycling, have placed many obstacles in the way of their success.

> *Everybody in government verbalizes support for recycling. But then it always seems to be the guys who are actually doing it who wind up getting hit.*

New York State's "Part 360" regulations, for example, by treating recycled material as waste, impose substantial additional costs on businesses that use secondary material -- even to the point of effectively discouraging the use of such material. Commercial processors complain that the Department of Environmental Conservation's caution in interpreting the regulations makes it difficult to develop new outlets for their material.

> *We went for a "beneficial use determination" for our wood products. We had contracts lined up, both domestic and export, so we could show there was a legitimate use. We went to extremes -- we went beyond any rules DEC had ever set. And when we ask for it, they say, "Well, we don't know, we've never thought about this use." They were afraid. So instead of telling you how you have to do something, they just say you can't do it.*

Similarly, the owner of a composting business suggests that as presently written, Part 360 virtually precludes the commercial composting of source-separated food waste in New York City.

Several companies cite workers compensation costs as being particularly onerous. Many firms reported that their rates have risen sharply in the past few years -- by as much as 120 percent -- and that workers compensation now costs 18 to 19 percent of total payroll. To some extent these complaints reflect a more general problem with workers compensation costs in New York State; but several executives also suggested that some value-added recycling businesses bear an especially heavy burden, because the state unfairly classi-

fies them for rate setting-purposes with other waste management enterprises that have much higher injury rates.

Several people noted the fact that workers compensation costs are substantially lower in New Jersey. One expressed his frustration at having to bid for city contracts against New Jersey firms that have a built-in competitive advantage because of the higher taxes and insurance premiums New York firms must bear.

> *If you want to do recycling in New York City, you might as well do it from New Jersey, and avoid the cost of workers comp in New York.*

(The experience of the Department of Sanitation does seem to reflect the processors' concerns about the cost of doing business here. Paper processors outside the city, particularly from New Jersey, have frequently offered lower prices than firms in the city for processing material collected by the Department.)

Some recyclers -- like many other small business people -- also cite high city taxes as a problem.

> *I just got an increase in my real property tax assessment. In this market, raising the assessment on an old industrial building in Greenpoint is insane. We're paying more so that big companies can pay less.*

One scrap processor suggested that as a fixed cost, high property taxes can be especially burdensome to commodity businesses that are simultaneously land-intensive and subject to severe price fluctuations. He urged that if the city

wishes to encourage greater investment in private recycling facilities, it should find a more flexible way to tax them.

Some representatives of small firms that process or use recycled material feel that their businesses do not get the kind of attention or support that city officials extend to much larger companies, and to companies they are seeking to attract to New York.

> *When Chase Manhattan sneezes the city jumps. But if a hundred small companies get sick, who notices?*
>
> *With all the city seems willing to do for [recycling-related] companies they're trying to get to come here, they don't seem to be doing much for those of us who are trying hard to stay.*

Many local business people also feel that, despite the establishment of a 5 percent preference for procurement of recycled material under Local Law 19, the city is not making adequate use of its own procurement and regulatory powers to create markets for recycled products generally, or to support the development of New York City recycling businesses in particular.

> *When do they start building in a 10 percent allowable premium for recyclable materials?....*
>
> *If the city bought the wiping rags that are generated by its own used clothing....the system might work better.*
>
> *If the city has recycling on its mind, why doesn't it try to recycle its own purchasing power, and keep its dollars in the city?*

Participants in our discussions noted that despite the city's commitment to recycling, some city officials -- no

doubt responding to the negative impacts some waste management facilities have on their communities -- continue to treat even well-run recycling businesses as undesirable uses. This can make it difficult for them to take advantage of opportunities for expansion. An amendment to the city's zoning resolution that has been proposed by the Brooklyn, Staten Island and Bronx borough presidents was cited as an example. By subjecting private recycling facilities to the ULURP review process, it could place new obstacles in the way of their development.

Some business owners also cite what seems to them a generally adversarial attitude on the part of city government. Carters and commercial processors believe that because of widespread allegations about their industry's connections to organized crime, they are scrutinized in ways that other businesses are not, and held to standards others are not required to meet.

Ironically, some also complain that state and city regulators are not very effective in dealing with less reputable elements in the industry. They see companies that are "trying to recycle, trying to do this the right way" as having a much harder time making a profit than certain carters and transfer station operators who, they say, routinely violate state and city regulations, and who do very little recycling. This is one area in which they often call for *more* rigorous state and city regulatory action.

The conflict that owners and managers of many of the city's small recycling businesses experience was neatly summed up by one of them:

> *My heart is telling me to go ahead and expand this business in New York. But my head is telling me I'd have to be a fool to do so.*

Opportunities for Development

As it seeks both to strengthen its recycling program and to develop new recycling-related industries, New York will find that small companies already doing business in the city are among its most valuable resources -- and also among the sharpest critics of its business environment. We do not presume to judge the validity of their criticisms -- a task that is well beyond the scope of this report. City officials must nevertheless remember that *those things which business decision-makers perceive to be real, whether real or not, have real consequences for the city's economy*. If it is to take full advantage of recycling-related development opportunities, the city will have to address more effectively the concerns described here.

One of the most important steps the city can take is to continue the process of improved communication and expanded consultation that it has undertaken during the past year. Participants in our discussions suggest that the kind of dialogue between city agency personnel and industry representatives that took place at the World Trade Center and Metrotech conferences on recycling and economic development

is essential to the success of the city's program. As one small business owner stated at the first conference.

> *The most significant thing about this meeting is that it happened at all. And the most important recommendation we could come up with today is that it happen on a regular basis.*

Continuing dialogue should help city officials understand more clearly the problems encountered by its recycling-related businesses, as well as how it can use more effectively the resource that they collectively represent. The Department's extensive consultations with carters and processors during the development of its commercial source separation regulations provide a good illustration of the benefits of more consistent communication.

Communication among public agencies themselves is also essential. Many agencies for which recycling is not a matter of central concern can nevertheless significantly affect the conditions under which recycling-related businesses develop and operate in the city. They include the City Planning Commission, the Department of Environmental Protection, the Economic Development Corporation, the Procurement Policy Board, the Office of the Comptroller, as well as state agencies such as the Department of Environmental Conservation and the Workers Compensation Board. If it is to achieve its recycling goals, the city will need close cooperation among and "consciousness-raising" within these agencies.

Fortunately, this kind of change is already under way. The General Services Department's use of the Tiffany Street

pier project as a pilot for increased use of recycled plastic lumber, and as a step toward development of plastic lumber businesses in the city, is an excellent example of public sector-creativity -- all the more noteworthy for the fact that neither recycling nor economic development is a prime responsibility for GSD. Moreover, the Mayor's Interagency Task Force on the Development of Recycling Businesses and Markets is now providing a continuing, high-level focus on how public agencies can help promote development in this area. The Task Force can play an important role in coordinating agency policies and procedures in areas like procurement and permitting.

There are also a number of more specific areas in which the city should work to create conditions more favorable to the growth of recycling-related firms already doing business in New York.

* While it may be essential during the early stages of development of the recycling program for the Department of Sanitation to retain considerable flexibility under its service contracts, the department should consider ways in which it might make its contractual relationships more stable and more predictable for its business partners.

* City and state representatives should work together with industry representatives to examine and to resolve the problems that certain aspects of the state's Part 360 regulations can cause for some recycling-related businesses, such as commercial composting enterprises.

* City and state representatives should also work with industry participants to explore what might be done 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 preference that the its procurement policies now provide for goods with recycled content, to provide an additional preference for those manufactured locally using recycled materials.

* As it considers revisions in those provisions of the zoning code governing industrial areas, the City Planning Commission should be sure to take into account the city's need to develop its commercial recycling "infrastructure," as well as the opportunities for growth of recycling-related industries that are now emerging.

NINE: OPPORTUNITIES FOR COMMUNITY PARTICIPATION

New York's low-income neighborhoods have a particular interest in recycling-related development, for several reasons. First, many of the industrial areas where such development is most likely to occur are adjacent to low-income neighborhoods; residents of these communities therefore have an interest in making sure their concerns about environmental impacts, traffic and other side effects of these developments are taken into account. Second, recycling-related industries can be an important source of employment and entrepreneurial opportunities for people in these neighborhoods in the years ahead. And finally, a successful program of recycling-related development may help alleviate some of the more noxious environmental problems affecting low-income neighborhoods, such as illegal dumping of tires.

In many neighborhoods around the city, community-based economic development organizations have already begun to show that they can play an important role in addressing these issues. In this section, we examine several aspects of their involvement in recycling-related economic development.

The Role of Community Economic Development Organizations

Interviews and discussions with representatives of the city's community-based economic development organizations

suggest a variety of ways these groups can effectively participate in recycling-related development -- as "brokers" of investment from outside the community; as direct sponsors of new enterprises; as joint venture partners; and as catalysts for local business development.

* **Brokering outside investment.**

Despite the handicaps that firms confront in trying to develop major new projects in the city, a significant share of the recycling-related development that occurs in New York during the next few years is likely to involve major new investments in plant and equipment by firms not now doing business (or just beginning to do business) here. There are in fact several such projects now in various stages of planning and development. Most of them will be located in or near low-income neighborhoods.

Community economic development organizations represent a resource that sponsors of such projects can use to help ensure that their projects are planned and developed in ways that are responsive to community needs and concerns. The New York Organic Fertilizer Corporation (NYOFCO) began in 1993 to use New York City's sewage sludge to manufacture fertilizer pellets at its plant in the Hunts Point section of the Bronx. From the project's earliest stages, NYOFCO worked with the Hunts Point Local Development Corporation to inform area residents about the project, and to hear their concerns. The LDC helped NYOFCO work with the local Community

Board, the Borough President's office and others to make sure that any negative impacts on the Hunts Point community would be minimized. The Hunts Point LDC also provided a mechanism through which residents of the area could be referred for jobs at the NYOFCO plant.

A consultant who worked for the company on the project says:

> *If your goal is to hire more people from the community, it may be easier to do that if you don't have to get involved with a large bureaucracy. As a private company, we were able to give a grant directly to the LDC. They had a network of contacts in the community that we couldn't match, and that the city couldn't match....Private industry will have no problem making this kind of financial commitment when they understand that it's in their interest to do it.*

The South Bronx Overall Economic Development Corporation has been designated to provide similar placement services, as well as basic training for new employees, in connection with the recycled newsprint mill that the Recycling Corporation of America is planning to build at the Harlem River Yards. As noted in Section Six, the mill would employ about 130 hourly employees, with annual wages in the range of $23,000 to $25,000. Assuring that local residents have access to blue-collar jobs of this quality is especially important in communities like Mott Haven and Hunts Point, where the average family income in 1990 was less than $10,000.

For some businesses, training will be as important as recruitment, especially with jobs that require particular

skills in areas like instrumentation and quality control. An executive with one manufacturing company says:

> *When you know you're going to need people in these job categories, on a project that has a two- or three-year development phase, you can go to training vendors or to the community colleges and say, "This is what we're going to need. We'll find candidates in the community who are qualified for this kind of training -- you provide the training, you bring them up to speed so that in two years they'll be ready."*

While recycling-related companies that have already been doing business in New York for years usually have their own informal networks for recruiting local workers, companies just entering the New York market do not have this advantage. LDC's and similar organizations can provide the newcomers with an effective way to tap into the local labor force -- and, in many cases, with a mechanism for referral and job placement that has already established its credibility in the community.

* *Local business development opportunities*

The "opportunity brokering" role that community organizations play should not be limited to the area of employment. These organizations can also help ensure that local contractors and vendors have a chance to participate in the development and operation of new recycling facilities. For example, many facilities for sorting and consolidation (including MRF's) and for value-added processing have relatively simple structural requirements. There are several small minority-owned construction firms in areas like North

Brooklyn or the South Bronx capable of building such facilities, and many more that could be employed as subcontractors. For these firms, construction projects in the $500,000 to $5 million range can represent important growth opportunities.

Moreover, research recently conducted for the Regional Alliance for Small Contractors by Dr. Timothy Bates of the New School demonstrates convincingly that these firms are much more likely than their larger white-owned counterparts to hire construction workers from minority communities.[14] Using their services will help ensure that investment in new recycling facilities also creates construction job opportunities for African-American and Hispanic New Yorkers.

The large companies with which community organizations work can themselves become resources for local business development efforts. For example, based on its own experience doing business with the city, NYOFCO developed a program for the Hunts Point LDC that helps neighborhood firms comply with the requirements of the city's VENDEX system.

While there could be many opportunities for local minority-owned firms to work as contractors or suppliers to larger companies in recycling-related industries, it is worth noting that New York's waste management, commercial processing and related businesses themselves appear to include almost no minority-owned firms. (All-Boro Recycling, a firm that provides processing services to community-based

recycling programs, provides a notable exception to the rule.) The city may want to explore further how it might help foster the development of minority-owned recycling enterprises.

* Direct enterprise creation.

The role of community organizations in recycling-related development need not be limited to the kind of "brokering" described above. Those with a greater entrepreneurial capabilities want to take on directly the responsibility for creating new recycling enterprises.

The pioneer in this type of involvement, and perhaps still its leading practitioner, is a South Bronx local development corporation called Bronx 2000. Since 1982, Bronx 2000 has sponsored a number of different recycling ventures. Its current activities include processing plastic from returned beverage containers, recycling of discarded shipping pallets, and use of reclaimed wood to manufacture furniture.

While Bronx 2000 has had some notable success, its experience also shows that recycling can be a very difficult business for a small community-based enterprise. In businesses like plastics processing, it may be very difficult for them to achieve the scale they will need to be competitive. It may also be difficult for small non-profit organizations to develop or recruit the executive and technical talent, and the capital resources, they need to make these

R2B2

Bronx 2000, a local development corporation, began its R2B2 venture (Recoverable Resources/Boro Bronx 2000, Inc.) in 1982 as an effort to provide residents of the East Tremont area with jobs and the opportunity to generate cash income, through the operation of an "buyback" center. R2B2 paid area residents in cash for bringing in certain recyclable materials.

After New York enacted legislation requiring the use of returnable soda and beer containers, R2B2 expanded its capacity to serve local bottlers, distributors and supermarkets by processing containers that their customers had redeemed. This later led R2B2 to establish one of the country's first enterprises engaged in the sorting and processing of post-consumer plastic containers.

Between 1985 and 1990, R2B2 operated its buyback center under contract to the Department of Sanitation. At its peak, the combined buyback and intermediate processing operations took in 50 tons per day and employed thirty people. R2B2 closed the buyback center, however, when the city, as a result of budget problems, withdrew its financial support. It has since developed its processing of post-consumer plastic into a national business, with the capacity to process about 20 million pounds of plastic per year.

Bronx 2000's newest environmental venture is in wood recycling and remanufacturing. It receives discarded pallets, crates and other wooden shipping material businesses in the area. The facility repairs pallets that are not too badly damaged, and also makes new ones from the wood it reclaims. But this new venture's most innovative product involves adding value to discarded wood by remanufacturing it into a line of simple, distictively-designed butcher-block furniture. Bronx 2000 is also training young people in the skills needed for furniture-making.

businesses work. In one of our focus group discussions, a manager with a community organization that is exploring the feasibility of creating an anti-freeze recycling venture recognized both the opportunity and the risk inherent in such an undertaking:

One of the reasons we focused on this is that we think it will work economically, but also because there doesn't seem to be anybody who's doing this right now. But we also recognize that we could get squashed pretty quickly if one of the big guys decided they really wanted to get into this business.

There are no doubt niches in which community organizations can succeed in directly creating new enterprises. Specialized collection systems that preserve or enhance the value of material by keeping it out of the waste stream -- such as community-based systems for collecting used clothing -- may be an especially promising area for the development of community-based enterprises. An executive with a Brooklyn organization suggested that:

Not everything that's recyclable should be going to big recycling centers....There are a lot of materials that lose their value when you try to do post-collection separation. There has to be a greater diversity of collection systems. For each material, each one will be different.

Another noted that:

The city [and the commercial carters] are going to be collecting nearly 30,000 tons a day. Even under the grandest scheme, community-based programs would only be taking in a fraction of that. There's plenty of room for everybody. Community-based organizations can expand into collection and processing of materials that Sanitation will never be able to handle very well -- textiles, film plastics. The city should be using them as incubators for new recycling techniques.

Another makes the point more starkly:

The goal has to be to deal with these materials outside the municipal and commercial waste stream. It makes no sense to ask people to separate them from the trash -- forget "ask," to fine them $500 if they don't do it -- and then to have DOS spend $300 a ton on a process that winds up reducing the value of the material.

* Joint ventures.

Fortunately, some community organizations may be able to find a "middle ground" between brokering outside investments and creating their own businesses. By entering into joint venture arrangements with established companies -- including other community-based enterprises such as R2B2 -- community organizations can secure for local recycling ventures the kind of technical, financial and market resources that they could not hope to provide on their own. One neighborhood organization in Brooklyn, for example, is currently negotiating with a Midwestern-based company to establish a joint venture specializing in the collection of household appliances such as refrigerators and air conditioners, and the removal of chlorofluorocarbons before they are recycled. Like many other community organizations, this group views alliances with larger companies as a way to play an active role in recycling-related development, while avoiding dependence on public funds that, given the city's long-term fiscal problems, may not always be available.

Joint ventures with established companies may also be an effective way to expand minority business participation in recycling-related industries. Existing minority companies in related fields such as building maintenance, trucking, construction and demolition, and some manufacturing industries may provide a pool of seasoned entrepreneurs from

which joint venture partners or other new entrants into recycling-related businesses might be drawn.

While joint ventures with private companies can be an effective way to bring both capital and technical resources into low-income areas, they are not easy to structure or manage. They require a great deal of work up front to ensure that the partners clearly articulate their goals, their respective responsibilities, and how risks and rewards are to be shared. The city needs to consider how it can help community organizations and small, minority-owned companies manage these relationships effectively.

*** Catalysts for recycling-related development.**

There is a fourth role that community economic development organizations can play -- one that many will no doubt find most compatible with their general role in the community. This involves acting as a catalyst for development of recycling-related enterprises within the local business community.

A local development corporation might, for example, conduct a survey of local businesses to determine what kinds of waste disposal problems they encounter, and what kinds of secondary materials they generate, the value of which might not now be fully recovered. An LDC serving an area with a number of struggling food processing businesses might find that they -- as well as neighborhood markets and restaurants -- could cut their waste disposal bills significantly by

having their food waste composted. Rather than trying to provide this service itself, the corporation might then present its findings to several commercial recy-clers in the neighborhood -- one of which might then decide to launch a joint venture with an established composting company.

While this example is hypothetical, the overall approach is not. The East Williamsburg Valley Industrial Development Corporation, for example, is currently conducting an analysis of the wood waste generated by firms in its area, and an assessment of possibilities for creating new enterprises that would use the material.

The Importance of Capacity-Building

The capacities of community organizations for constructive involvement in recycling-related development vary greatly. Managers of these organizations themselves recognize that if they are to be successful, they will have to develop and maintain some expertise in this area.

Several participants in our discussion and focus groups noted that both the state and the city have been willing to make long-term commitments to capacity-building in other areas, such as non-profit housing development and commercial strip revitalization. A manager with a South Bronx organization says:

> *You have to be able to build up some institutional memory. It's not enough to be involved in one three-month project, or to have this be something you give to interns to work on.*

An executive with a Brooklyn organization says:

> *We've had a contract for seven years. It's not a lot of money, but it's been enough to pay for one professional staff person full-time, and for her to develop some continuity, and for a piece of a secretary, and for some staff development. It's not a free ride -- there are performance benchmarks in the contract that we have to meet. This might be a model for what the state or the city could do in this area -- you just can't do it on a one-year grant.*

The city's Economic Development Corporation, the State Department of Economic Development and the State Urban Development Corporation have all provided support for particular recycling-related development projects undertaken by community organizations. Several New York City foundations, most notably the New York Community Trust, have also provided support to community organizations for such projects. Neither the state nor the city, however, has to date provided continuing support, financial or otherwise, for building local capacity for recycling-related development.

Opportunities for Development

New York City has a vital interest in ensuring community participation in recycling-related development. One way it can do so is by helping community economic development organizations function effectively -- as advocates for neighborhood interests, as partners in new enterprise development, and as catalysts for private development.

There are several practical steps the city can take to help community economic development organizations increase their effectiveness.

* In any contexts in which the city is offering some benefit to private businesses -- such as the planned RFP for use of the city's mixed paper, or new RFP's for private MRF operators -- it should require some explanation of how those businesses will assure that community concerns are met; and specific plans for providing employment, training and contracting opportunities to local residents and businesses.

* Firms planning to start recycling-related businesses in New York should not be *required* to enlist the services of, or become partners with, neighborhood-based organizations. But the city should especially encourage firms that are entering the New York market for the first time, or that otherwise lack roots in the community, to enter into such relationships.

* The city should work jointly with selected community organizations and local companies to explore further areas in which there may be specific, near-term opportunities for cooperation between businesses and community organizations -- such as in the development of community-based collection systems for used clothing and household appliances.

* The city should consider creation of a program aimed at helping community organizations participate more effectively in recycling-related development, by providing them with information, technical assistance and training on such topics as the development and management of joint ventures.

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

TEN: CONCLUSION

This report has described and analyzed a variety of economic development opportunities that might arise in New York City as the city expands its recycling program. In this concluding section, we highlight some of the more significant opportunities we have identified, and summarize the implications of our findings for city policy.

Areas of Opportunity

In the collection, sorting and consolidation sector, we have identified three important development opportunities.

* Reduction of waste disposal costs for New York City businesses, by promoting increased competition and rationalization in the commercial carting industry.

* Private investment in the greatly-expanded capacity for sorting and consolidating both commercial and municipal solid waste that will be required if the city is to meet its recycling goals.

* Development and expansion of specialized systems for collection and sorting of selected secondary materials -- glass bottles and used clothing, for example -- aimed at preserving the value of these materials by keeping them out of the generic waste stream.

In the brokerage sector, there will be few opportunities for new development in the city; and in any case the city's ability to influence decisions baout the location of this business is quite limited. There is one possible exception, however, that merits further exploration by the city.

* Exploring the feasibility and desirability of facilitating trading in recycled materials, through the development of an electronic exchange.

In the value-added processing sector, there are several industry segments in which the development of new businesses or new facilities appears to be feasible. They include:

* Pelletizing recycled plastics (HDPE and LDPE, both rigid and film).
* Shredding and densifying steel cans.
* Producing furnace-ready cullet from waste glass.
* Shredding and crumbing waste tires.
* Composting source-separated food and other organic waste.

In the fabricating sector, opportunities for development will be limited. There are nevertheless several industry segments that are worth the city's attention.

* Production of newsprint, office paper and possibly other products from recycled paper.
* Fabrication of commercial and consumer plastic products, especially where there are opportunities for integration of manufacturing with sorting, consolidation and value-added processing activities.
* Development of businesses that manufacture building products from recycled materials, using the leverage that the city derives from its role in public construction and its authority to set standards under the building code.

In addition to the opportunities we have identified in each of these sectors, we believe the city should also give special attention to opportunities for product and process innovation and creation of new enterprises in emerging

industry segments. Two areas should be of particular interest to the city:

* Development of new businesses and new products that make innovative use of hard-to-recycle materials that might otherwise wind up in the residual waste stream.

* Development of process improvements that enhance the quality and marketability of material collected in the city.

Implications for City Policy

The findings presented in this report have policy implications that city officials should keep in mind as they proceed to build upon the opportunities we have identified.

First, even as they move aggressively to take advantage of current business opportunities, city personnel also need to become familiar with the underlying dynamics of various recycling-related industries, and to monitor these industries continually. The city should be able not only to respond to new business opportunities as they emerge, but to anticipate them based on trends and developments in these industries.

Second, the central role that the city has taken on in the recycling process means that several city agencies -- especially the Department of Sanitation -- are being required to take on new and unfamiliar roles. Because recycling is in many ways more a business than a public service, city agencies need to learn how to operate in a more business-like fashion -- in how they maintain the quality of materials that are under their control, in how they contract

with companies that process the city's materials, in how they dispose of those materials.

Third, the experience and capabilities of small companies already engaged in recycling-related businesses in New York are among the city's most valuable resources for continued development in this area. The city's waste management and economic development strategies should be designed to make the greatest possible use of these companies, and to create in New York an environment that supports and encourages their continued growth.

Fourth, the city's ability to shape markets for products that incorporate recycled materials is one of its most powerful tools for promoting recycling-related economic development. City agencies need the flexibility to be more aggressive and more creative in their use of the procurement process, and in the use of regulatory instruments like the building code, to promote recycling-related development.

Finally, extensive community participation is essential to the success of recycling-related development in New York. This participation should encompass community involvement in shaping major recycling-related projects, and the participation of local residents in recycling-related industries both as employees and as entrepreneurs. Community economic development organizations can be an effective vehicle for ensuring such participation; city agencies should encourage and support their involvement.

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.

NOTES

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