



Recycling Markets and Opportunities for Local Government Recycling Program Expansion

FACT SHEET

OVERVIEW

It is commonly argued that there are limits to recycling because of lack of markets or weakness in markets. However, the experience of many North Carolina local governments has shown that markets are adequate and allow for program expansion. Moreover, markets have consistently indicated their desire to consume more materials (see *Markets Prospectus* below). Local governments have the power to strengthen markets through buy recycled programs. They also have the power to make their programs more efficient and work more effectively with markets. In short, recycling markets allow local governments to expand and improve programs; taking advantage of the opportunities to do so can result in greater cost-efficiency.

HOW RECYCLING MARKETS WORK

Recyclable materials are commodities. They have value to manufacturers as “feedstock” to make products. Many industries increasingly **depend** on recycled materials to make products.

Markets in their simplest form are *relationships* between suppliers and demanders. The major commodity industries (paper, plastic, metals, glass, etc.) are continuing to make a demand shift toward recycled materials, partly in response to supplies available from local government curbside and drop-off programs and to the growing demand for recycled products.

The commodity industries are making decisions every day on which feedstocks they will use to make their products. A rising level of commitment from suppliers (local governments) and demanders (industry) of recycled feedstock has been the pattern of the 1990s. These commitments and the associated market relationships can easily grow. Industry will decidedly **not** invest in new recycled capacity if suppliers (e.g., local governments) draw back from their commitment. They will respond with new capacity as supply increases. The paper industry, for example, invested in over *10 million tons* in new recycled paper-making capacity in the 1990s.

Moving a recycled material from a home or business to a market requires three main steps. It must be collected, processed (e.g., baled or crushed) for efficient transport, and delivered to a manufacturing plant to be remade into new products. Each of these steps has costs, but there are opportunities for revenues as well. Revenues depend on many things: for example, the kind of material, who is responsible for what steps, and what the manufacturer is able to sell their product for. Recyclable commodities are also part of the general global trade in commodities and they compete with virgin materials, so worldwide economic forces can affect prices.

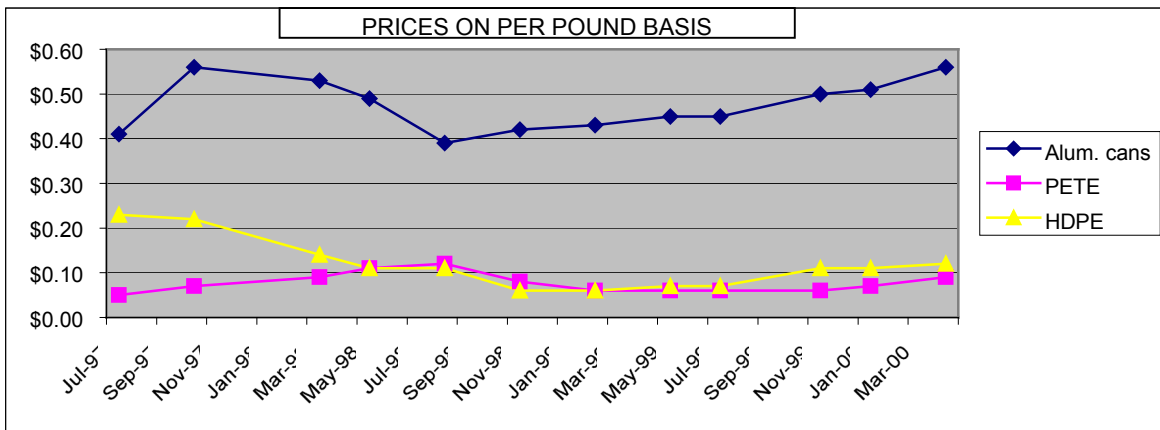
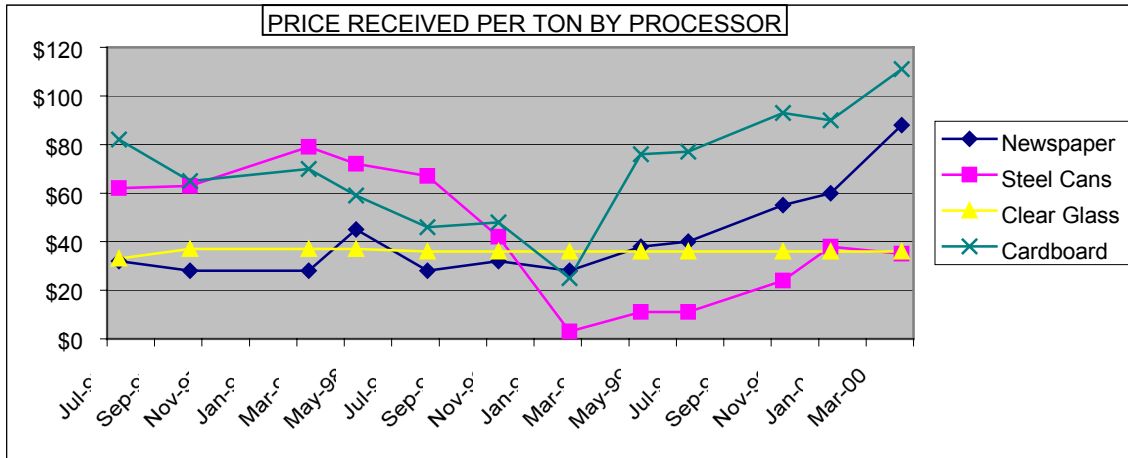
As with any commodity or product, there is a relationship but also a difference between *prices* paid for a material and the *demand* for the material. Gasoline, for example, is in constant demand, but gasoline process fall or rise in response to many factors. Prices can fluctuate for any number of reasons, but that does not mean that *demand* does not exist. For example, prices paid for recycled PETE plastic (soda bottles) have been subdued in recent years because of low oil prices and a large competing virgin supply. However, there has been consistent *demand* for PETE even at these low prices and no local government or processor has been turned away from the market.

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The following tables shows a recent history of prices received for commonly recycled materials by three processors in eastern, central, and western North Carolina. Note how prices fluctuate, but never go negative or show any other sign of no demand.



MARKETS PROSPECTUS

Recycling markets indicate a desire and a capacity to consume more materials. Below is a short list of examples and evidence of growing or unfulfilled market appetite for a number of commodities.

- Glass** - The three existing glass plants in North Carolina (which has more plants than most other states) have the capacity to consume glass at *quadruple* the rate of current local government recovery. Container Recycling Alliance in Raleigh, the major processor of glass in eastern Piedmont, is operating at only 50% of it capacity. As shown in the chart above, glass prices are extremely stable.
- Newspaper** - A 1998 survey of newsprint mills in the southeast US documented their ability to consume thousands of tons more material than they currently receive. The North Carolina recycled content newsprint law was changed in 1999 to encourage more publisher involvement in collection because mills could not get enough material to make the mandated high recycled-content sheet. As a result, the Raleigh News and Observer now offers a no-cost recycling service to county recycling programs in the eastern Piedmont and coastal plain.
- Paper in General** - In 1990, the U.S. paper industry established a goal to recover 40 percent of all paper Americans used in 1995. The goal was achieved a year ahead of schedule. The industry has established a new goal to recover 50 percent of all paper and to promote efficient paper recovery programs. As of 1998, the U.S. paper recovery was 45 percent and rising. Mills in North Carolina and the Southeast indicate a healthy appetite for

new supplies of paper across the spectrum of grades. For example, the Caraustar paperboard mill in Charlotte and two similar mills in South Carolina are actively seeking new sources of mixed paper. Most paper grades at the time this fact sheet was being written are at historically high prices (see charts above). Consolidation in the paper industry and new on-line trading systems are decreasing the volatility of paper market trading.

- **Plastics** – The commonly collected plastics, PETE (soda bottles) and HDPE (e.g., milk jugs, etc.) have suffered low prices in the past couple of years, but their prices have begun to rise (see chart above). Trade association groups consistently report that demand exceeds supply for both resins. Both major soft drink bottlers, Coke and Pepsi, are recommitting themselves to putting recycled content plastic in their bottles. They would move more aggressively but are concerned about competing with carpet companies over the limited supply of collected PETE. Plastics processors in North Carolina have indicated that they have a much harder time finding supply rather than demand for their materials – one has noted that dwindling supply is becoming “a crisis.”
- **Aluminum Cans** – An analysis in the March 2000 Resource Recycling documented a “bull market” in aluminum recycling, in large part due to the rebound of the global economy. The chart on prices above reflects increasing demand. Global inventories are at their lowest in a decade; as the industry fills those inventories, prices should rise and stay stable. Aluminum experiences ups and downs, as does any market, but on a material values basis, it is clearly the most lucrative market available to local government programs.
- **Steel Cans** – Steel can prices went through a severe downfall in 1999 as the North American scrap industry struggled with “dumping” of cheap foreign scrap into domestic markets. Before then, prices were very stable and can prices have recently rebounded (see chart above). Because steel cans are a very small portion of overall scrap ferrous metal consumed by the steel industry, there is almost an insatiable demand for cans. The difficulty for North Carolina recyclers is that cans must be shipped to end-use mills out of state. This situation will change with the opening of the Nucor mill in Hertford County in coming years.
- **Construction and Demolition Waste** – The construction and demolition waste stream, or C&D, contains elements (e.g., cardboard, metals) that are readily recyclable, and that have a widespread infrastructure and stable demand. The recycling infrastructure for many other elements is growing. A recycler of gypsum wallboard in the Piedmont has experienced much difficulty finding adequate supply. Markets for materials like vinyl siding and carpet are growing, and the number of mobile grinding contractors for concrete is also rising. In many cases, local governments need not necessarily put in a recycling infrastructure for C&D recycling, but instead concentrate on promoting and facilitating the private infrastructure that is developing in the community.

WHAT SOME COMMUNITIES ARE EXPERIENCING AND WHAT THEY ARE DOING:

Local government programs in North Carolina either market their materials directly or through use of a contractor. Those that market directly usually have a processing center for materials that provides the critical link between collection efforts and the transportation of materials to market. Other communities have arranged by contract for the processing of materials or their contracted hauler takes on that role. Either way, **processing is a critical step in consolidating materials, separating commingled streams, removing contaminants, and preparing recyclables for efficient transportation.** Because markets are almost always outside of a community and often distant, efficiency is gained through shipping loads that are as large and clean as possible.

In June 2000, DPPEA surveyed local governments on their experience with recycling markets. Those surveyed represented a mix of municipal and county governments of different sizes spread across North Carolina. They also represented both those that market directly and those that market through contractors.

Although the survey revealed some specific challenges, especially in certain rural areas of North Carolina, it documented that markets in general allow for continuation and strengthening of recycling programs. Fifteen out of sixteen respondents said they could increase recovery of currently collected materials without experiencing market problems. The one negative response had to do with C&D materials, which has a relatively weak infrastructure in their county. Two counties noted that “markets are begging for materials.” Eleven out of sixteen respondents said

that markets would allow them to collect other types of materials. Six communities indicated they had to stop collection of a certain material for lack of or disappearance of a market, but none of the materials mentioned were “mainstream” curbside and drop-off recyclables (materials mentioned included Styrofoam, PVC bottles, textiles, and mixed paper – two of the three communities that mentioned mixed paper are now recycling that commodity).

Some of the respondents to the survey had interesting insights on working with markets. The more successful communities remarked on the importance of building a good *relationship* with markets, with open lines of communication and loyalties that help the communities weather market downturns. One recycling coordinator in eastern NC notes: “I have been faithful to my markets, knowing they will help a long-time customer out first when markets get tight.” In addition, communities mentioned the importance of networking with other local governments, sharing information and exchanging tips on markets and marketing techniques. Moreover, local governments can help themselves by delivering clean and consistent supplies – as one respondent said: “All our buyers are willing to take all we can generate – we are well known for high-quality materials.”

When it comes to prices, some communities cope with fluctuations by just “going with the flow,” while others advise to “estimate very low, and do not depend on revenues for operating expenses.” In addition to budgeting conservatively, one county deals with variable revenues by concentrating instead on controlling costs, which has long-term and consistent benefits for the program. Most savvy marketers also pay close attention to prices published in journals and on Web sites. Many communicate with colleagues and markets to keep track of trends.

In addition to market wisdoms communicated by survey respondents, two rural counties and one middle-sized town have shown interesting examples of how they have worked with markets:

Swain County, in the far western part of North Carolina, experienced difficulties in making the recycling of glass efficient. Glass is heavy, has steady but low prices, and Swain County was far from markets. In the fall of 1999, Swain County put in place a simple bunker system to collect and store glass until it had enough to transport with a twenty ton “dump trailer.” This allowed the county to cut handling costs and abandon the inefficient use of Gaylord boxes (which provided no revenue). As a result, Swain’s large shipped loads now net the County revenues over its lower shipping expenses.

Realizing that large quantities of corrugated cardboard were being disposed in Columbus County, the County implemented a disposal diversion ordinance for corrugated cardboard, made a small investment to develop a processing facility and developed a relationship with a South Carolina paper market. The supply of cardboard was so large that the market involved offered to put in a new conveyor-fed baler to improve processing efficiency. The County uses prison labor to minimize operating costs. The county anticipates baling approximately 3,000 tons of corrugated a year and will soon start baling corrugated for other counties. In exchange for baling corrugated cardboard from other counties, Columbus County will receive 50% of revenues generated.

The City of Laurinburg, located in Scotland County, is probably the smallest community in North Carolina that processes their own materials. Even as a small community the City has good relationships with markets that are based on loyalty. The City feels that program expansions are limited more by equipment (collection vehicles) than by markets and tends to take a nonchalant approach to market fluctuations.

WHAT COMMUNITIES CAN DO TO WORK BETTER WITH MARKETS AND INCREASE RECOVERY?

- **Have dialogue with markets** – there is no substitute for direct and frequent communication with markets. Site visits to market facilities, networking at conferences, or simple phone interviews can yield direct information on prices, demand, specifications, and opportunities for productive relationships.
- **Track market situations** – subscriptions to journals, on-line searching, and accessing published market information can give recycling programs a clear sense of current market conditions, market projections, and an idea of whether they are currently getting a “good deal” on prices.

- **Improve processing efficiency** – part of the feeling that there are “no markets” comes experiencing low revenues relative to high processing costs. Improving processing efficiency can tip the balance more positively – for example, using glass bunkers for bulk storage and shipment has dramatically improved the marketing economics of that material for many counties.
- **Partner with markets on processing capacity** – markets are often willing to work with local governments to supply processing equipment in return for receiving materials. A typical scenario is for a paper mill to supply a baler or trailers to process and store cardboard in exchange for a commitment to supply the mill. These types of marketing arrangements are very stable.
- **Take advantage of existing processing capacity** – in some areas of the state, counties have developed processing capacity that other counties can take advantage of. For example, a glass bunker built by one rural county might be used by others, which increases the amount of materials handled and the overall efficiency of the operation. Regionalization can improve the ability to market materials.
- **Use contracts wisely and build long-term relationships** – it is tempting to chase “spot markets,” which can yield some high windfall revenues in the “good times.” Some markets are willing to enter long term contracts for materials which can sometimes be designed to include “floor” or minimum prices and guarantee a price over this period. The prices paid are generally lower than current market price, but these agreements can provide protection during market downturns. Even without contracts, loyal market relationships can yield big benefits.
- **Invest in and encourage processing capacity** – as many local governments have discovered, the best way to stabilize and maximize relationships with recycling markets, and to be able to expand programs, is to invest in processing capacity. These investments can take the form of a large “MRF” (material recovery facility) or smaller facilities housing a baler or storage trailers. Local governments can also encourage private processing through material disposal bans and long-term collection contracts.
- **Buy Recycled** – perhaps the single most powerful way local governments can strengthen markets is to buy products made from recycled materials. Extensive research has shown that recycled products are competitive with virgin products in quality and cost. Manufacturers of recycled products will increase their consumption of collected materials if their products are being purchased.
- **Work to develop markets** – local governments can encourage the development of local markets through their policies and programs, and by simple tasks like gathering and disseminating good data. The Region J Council of Governments is working to document the volume, nature and sources of wood waste in the Triangle area to use in attracting wood waste processors and end users to the area. Davidson County’s wood waste ban resulted in the development of a flourishing business processing wood waste near the county’s landfill.

STRATEGIES FOR DEALING WITH FLUCTUATING RECYCLING REVENUES

Natural fluctuations in material prices can be frustrating and can complicate the revenue picture for local programs. DPPEA recommends that local governments be very conservative in budgeting for recycling revenues so that shortfalls do not harm delivery of recycling services. Local governments can consult their own records or published sources on market prices to determine the minimum expectation level for recycling revenues. High market revenues should be used to “smooth out” program costs over the long term. Some strategic ways to use an unexpected revenue windfall include:

- pay off equipment debt
- accelerate capital purchases (so they are not made during periods of low revenues)
- make new capital improvements that improve efficiency
- replace old, inefficient equipment
- buy out leases

These strategies match high expense needs with periods of high revenues, reducing reliance on general fund or local taxes and fees. They allow a local government to “ride out” low recycling revenue periods during which capital purchases are difficult to afford. Recycling prices and revenues are bound to fluctuate. A more reliable way to in effect generate revenue is to improve program efficiency.

RECYCLING COSTS VERSUS COLLECTION AND DISPOSAL COSTS

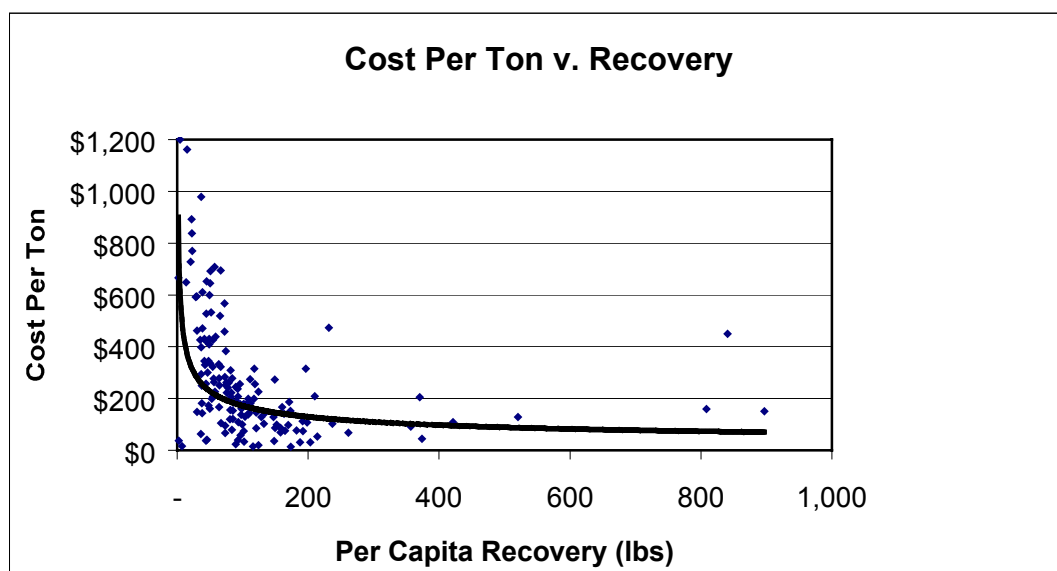
Rarely does the inherent value in a material cover the full range of collection, processing, and marketing of materials – hence, some people say recycling is a “money loser.” However, by the same terms, solid waste is also a “money loser.” Local governments must cover the cost of solid waste collection and disposal through taxes and fees because there is no “market” for garbage. Un-recycled materials enter landfills that eventually fill up, necessitating a long-term period of environmental monitoring and driving the need for controversial landfill siting.

Both recycling and solid waste collection/disposal cost money. Recycling revenues can help defray recycling costs and forestall the need for new disposal capacity. Though recycling rarely gets credit, avoided costs are part of the “revenues” that recycling brings a community.

An analysis of the full costs of solid waste management conducted by DPPEA in 1996 found that cities involved in the study had an average collection and disposal cost of \$113 per ton and an average recycling cost of \$139 per ton. Similar in proportion, the study found that counties had an average collection and disposal cost of \$88 per ton and an average recycling cost of \$106 per ton. This study also found several correlations among the data.

Perhaps most important was that the cost of recycling is closely related to the recovery rate. As recovery rates increases, the cost per ton of recycling decreases. This is a logical conclusion because there are fixed costs associated with operating a recycling program. Thus, by increasing recovery, most communities are increasing the actual tonnage of material recovered without changing overall program costs. At a point, a community would need to purchase additional equipment in order to recover more material. However, most communities are not maximizing their recycling resources to the extent that an increase in fixed costs would occur.

This concept can be shown graphically using local government data from FY 1998-99. The following figure presents data from 153 municipalities in North Carolina that operate recycling programs. Although this is not a scientific analysis, as communities increase recovery, the cost per ton associated with such recovery tends to decline. This can be seen clearly in the trend line. It should be noted that a decrease in the cost per ton does not indicate a decrease in overall programs costs. It is simply a measure of efficiency.



THE OTHER KIND OF EFFICIENCY

Increasing recovery is not the only method way to improve efficiency. Addressing areas such as routing, processing, and collection frequency can often result in cost savings that greatly outweigh recycling revenues. The extra effort to find better markets may provide some additional revenue, but overall these increases are small compared to the savings that can be achieved by seeking increased efficiency in program operations.

Example: Chatham County

Chatham County has recently undertaken two strategic steps to improve the efficiency of their waste reduction program. First the County is seeking to install a baler and conveyor system to handle mixed paper. By working closely with a paper market in North Carolina, Chatham County has been able to leverage their mixed paper to develop a more efficient program. The paper market will sell Chatham County the baler/conveyor system and install it for \$50,000. The market has also indicated they will pay an average of \$25 per ton for baled mixed paper and provide the transportation. Given the County's existing mixed paper recovery, it is anticipated that the County would receive about \$6,500 per year for the material. Furthermore, the County would eliminate fees currently paid to recycle mixed paper and avoid the associated hauling costs. The result is a first year net savings of approximately \$14,700.

The second step the County will undertake is the installation of glass bunkers. Glass bunkers simply allow a local government to store glass until full loads can be taken to market. This maximizes transport efficiency and has been proven to work in communities like Swain County and New Hanover County. Using an innovative approach that will use old roll-off dumpsters, the County can construct the bunker for about \$29,000. The County anticipates that they will save about \$10,000 a year in hauling costs. Although glass bunkers are inexpensive (most cost from \$10,000 to \$15,000) and can provide substantial savings, there are only a handful in-place in North Carolina.

Example: City of Raleigh

The City of Raleigh's FY1998-99 annual report indicates that solid waste collection and disposal costs the City \$168.43 per ton and that recycling costs \$138.08 per ton. This report also indicates a 62% participation rate in the City's recycling program. The City currently pays a tipping fee of \$23.50 per ton at the North Wake Landfill and receives tipping revenue of \$31 per ton from the City's primary recycling market. By increasing the participation rate in recycling, the city could generate substantial savings/revenues.

For example, the City averages 483.7 lbs per each year from households that participate in curbside recycling. If participation could be increased to 75% by providing increased funding for public education, approximately 9,928 more households would begin recycling. At 483.7 lbs per household, about 2,400 additional tons of recycling would be collected each year, not including increased recycling from existing participants that accompanies increased education. For every extra ton of material that is recycled, the City would receive \$31 in tipping revenue and save \$23.50 in decreased tipping fees. Assuming that any increased costs in recycling collection would be offset by decreased costs in solid waste collection, the City would have a net savings of almost \$131,000 per year.

Education and Participation

Often, the most over-looked aspects of recycling program efficiency is education. Just as any business that wants to be successful needs to advertise, so to do local governments. Although educating citizens on how to recycle as well as the importance of recycling costs money, the following analysis taken from the 1998-99 Solid Waste Management Annual Report shows clearly that it is an important aspect to the efficacy of local recycling programs.

Of the 409 local governments with recycling programs in North Carolina, 50%, or 203 communities have an education program to inform citizens of program requirements and the benefits of waste reduction. The table on page 8 shows that education is critical for local governments to operate efficient and effective waste reduction programs. **Participation is 21% higher in municipal curbside programs that provide education to the public.** Furthermore, these programs recover an average of **110 pounds more** per household served. Local governments without education programs are missing opportunities to maximize the efficiency of their recycling programs.

Local Government	Number of Programs	Participation (weighted avg)	Pounds per household participating	Pounds per household served
Curbside w/ education	117	64%	532.01	340.40
Curbside w/o education	145	53%	433.83	230.11

The lack of strong educational efforts is a clear detriment to higher waste diversion. The average participation rate for all local government recycling programs is 45% (56 % for curbside and 32% for drop-off). To improve participation rates local governments should pursue options such as increased education; economic incentives for reduction (e.g., pay as you throw); disposal diversion ordinances and locally mandated recycling. An increase in the average statewide participation rate from 45% to 70% or 75% would equate to an estimated **200,000 ton increase in diversion**. Although an increase in participation would result in a dramatic increase in recovery, the expansion of existing programs into new materials (e.g., mixed paper) also has the potential to substantially increase recovery.

CONCLUSION

This fact sheet has been designed to address the issue of recycling markets and their bearing on the ability of local governments to increase collection of materials. Contrary to a common myth, recycling markets are readily available for a wide range of materials and demand is growing. Many communities across the state have been able to expand programs to take advantage of these markets. Local governments can employ a wide range of strategies to work better with markets and to reduce their dependence on recycling market revenues as the sole means of improving their programs. Prices will fluctuate, but savvy local government programs can survive and even thrive through the peaks and valleys of recycling markets. Local communities can also improve the overall costs of recycling by concentrating on increasing recycling participation and taking other steps to improve efficiency.



The North Carolina Division of Pollution Prevention and Environmental Assistance provides free, non-regulatory technical assistance and education on methods to eliminate, reduce, or recycle wastes before they become pollutants or require disposal. Telephone DPPEA at 919.715.6500 or 800.763.0136 for assistance with issues in this Fact Sheet or any of your waste reduction concerns.

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