Packaging Restrictions Research: Targeting Packaging for Reduction, Reuse, Recycling and Recycled Content

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BWPRR Overview

This report is one of a number of waste prevention reports prepared under a long-term contract by consultant Science Applications International Corporation, and issued at contract conclusion. The reports are listed below. The New York City Department of Sanitation (DOS, or the Department), Bureau of Waste Prevention, Reuse and Recycling (BWPRR), the sponsor, has issued a Foreword to the studies; it acknowledges the many contributors and frames a position based on its considerable efforts to review, practice, and measure waste prevention. The Foreword appears at the beginning of the first report in the series, *Measuring Waste Prevention in New York City*. Interested readers are strongly encouraged to access the material through the Department's web site at: www.ci.nyc.ny.us/strongest Print or electronic versions are available through BWPRR.

This report on packaging restrictions fulfills a recommendation of the Fresh Kills Task Force. It provides information about the beverage deposit laws of particular states, minimum content standards of particular states, and case studies of national manufacturer responsibility laws in four countries. Release of the report is not an endorsement of recommendations made by the consultant. As it is made clear, broad public and political support will be required for the various cross-jurisdictional – City and State, or State and Federal – policy tools introduced here.

As to predicting the efficacy of the various policy tools, reading the report will show how hard it is to find solid analytical ground in this policy arena. Despite its considerable detail, the report does not project revenue from product charges or advance disposal fees. And it does not address changes in demand, derived from demand elasticities, or related estimates of sales losses across state borders, where prices differ because of the imposition of fees.

Packaging is described as 35% of the waste stream, and thus a good target for some kind an advanced disposal fee. It should be be noted, however, that one third of all packaging, by weight, is corrugated cardboard, more than half of which is already recycled. [The 35% measure is the national estimate of the portion of all packaging materials, including paper and cardboard (Franklin Associates, *Characterization of Municipal Solid Waste in the United States: 1995 Update*, US EPA, 3/96). According to the Franklin report, slightly more than one third of it is corrugated cardboard, recycled at more than 50%.] To the extent that an advanced disposal fee system creates a new collection system for recyclables, it would duplicate what already exists for corrugated.

These limitations notwithstanding, the consultant has provided a service in setting forth the range of policy instruments to be addressed.

Waste Prevention Reports:

- *Measuring Waste Prevention in New York City*
- *Survey of Waste Prevention Programs in Major Cities, States and Countries*
- *Procurement Strategies Pursued by Federal Agencies and Jurisdictions Beyond NYC for Waste Prevention and Recycled Products*
- *Inter-Agency Task Force Action Plan to Encourage the Use of Recycled-Content Building Materials*
- *Materials Exchange Research Report*
- *Characterization of NYC's Solid Waste Stream*
- *Life Span Costing Analysis Case Studies*
- *Packaging Restrictions Research: Targeting Packaging for Reduction, Reuse and Recycled Content*
- *NYCitySen$e Summary Report*
- *NYC WasteLe$$ Summary Report*

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Executive Summary

Targeting Packaging For Reduction, Reuse, Recycling And Recycled Content

Introduction:

The City of New York Department of Sanitation (DOS) has initiated studies and analyses specifically to identify programs and measures the City can consider for implementation to reduce the amount of trash collected by DOS by increasing waste prevention and recycling. DOS is seeking viable strategies to reduce the generation and disposal of approximately 4.5 million tons of household trash per year in the context of the City's decision to close its one remaining landfill by the end of 2001.

In support of the development of waste reduction strategies, the DOS initiated a review and analysis of waste reduction policies and programs that have proven successful elsewhere to determine if they may hold promise for implementation in New York City. By examining strategies implemented within other jurisdictions in the United States and abroad, DOS is seeking to identify proven approaches or elements of the strategies that are potentially adaptable by Federal, NY State and/or local government, and beneficial for New York City. This draft report presents the preliminary results of a review of selected waste prevention and recycling initiatives, and presents recommendations for DOS.

An initial review of current practices and programs identified 14 major policies with potential applicability to New York City's waste reduction challenge. These policies include:

Expanded Bottle Bills	Landfill Bans
Advance Disposal Fees	User Fees
Manufacturer Responsibility	National Trust Fund
Shared Responsibility	Virgin Materials Tax
Minimum Content Standards	Packaging Tax
Utilization Requirements	Packaging Stewardship
Ban on Non-Recyclable Materials	Tradable Credits

DOS's contracted consultant, Science Applications International Corporation (SAIC), researched these programs to review the implementation approaches undertaken in other jurisdictions, and the commodities and products targeted in implementation; evaluated industry and consumer response to the programs; analyzed waste prevention, recycling and other program results; and identified factors complicating or enhancing program implementation or administration. Based on the preliminary review and the recommendations of SAIC, DOS selected the first five policies above for in-depth analysis.

This document presents the results of that research. In general, the analyses indicate that all five programs have potential to reduce DOS-collected waste or to generate revenues to

support waste reduction or waste management programs. In most cases the effectiveness of their implementation and the overall value of the programs relies, to a significant degree, on the cooperation of the New York regulatory and/or environmental authorities, those of the adjacent states of Pennsylvania, New Jersey and Connecticut, and the Federal government.

The following discussion summarizes the basic premise and approach of each measure; recommendations for implementation by the Federal government, New York State or City, and the major implementation challenges posed.

Expanded Bottle Bill

Basic Premise:

The basic premise of the Expanded Bottle Bill is the expansion of the universe of containers subject to the current New York State container deposit legislation. Such expansion can include containers for wine, liquor and other beverages sold in the State, exclusive of milk and baby formula.

Study Recommendations:

Goals for (1) the reduction of landfill-destined waste within New York City; and (2) reduction of the City's waste management costs will both be well served by implementation of the Expanded Bottle Bill. Based on a consideration of the available universe of additional materials and potential impact on the New York City waste management infrastructure, this study estimates that the Expanded Bottle Bill has the potential to divert 200,000 tons of waste, 100,000 tons of which is residential, per year by the year 2000. The study also estimates that implementation of the Expanded Bottle Bill has the potential to reduce the City's waste management costs by $9,000,000 per year, factoring in savings from avoided disposal and reduced curbside collection costs. Finally, the study examines the potential funds that could be made available for State and local solid waste prevention and management programs if New York State were to require industry to place the unclaimed deposits into a NY State fund dedicated for this purpose.

Implementation Challenges:

An Expanded Bottle Bill can be enacted through passage of an amendment to New York State's existing container deposit legislation. The City and the State will likely bear little if any implementation or administrative costs. Beverage manufacturers, distributors, and retailers may incur costs from an expanded program, and are likely to resist expansion. Consumers and environmental advocates are likely to support an expanded program.

An Expanded Bottle Bill would have implications for DOS compliance with the tonnage requirements of Local Law 19 of 1989. Specifically, diversion of additional containers to private sector collection would reduce DOS-collected recycling tonnage, undermining compliance with the recycling tonnage requirements of local law.

Advanced Disposal Fees (ADFs)

Basic Premise:

An ADF is a fee levied on the distribution or sale of a specific product. The fee may be designed to achieve any or all of the three following goals:

1. Generate revenue to fund waste prevention, recycling and related environmental programs,
2. Discourage consumer purchase of hard-to-dispose products or disposable products for which cost-competitive durable alternatives are readily available, and
3. Encourage manufacturers to eliminate and/or reduce packaging, and/or increase the recycled content and/or recyclability of targeted products and/or packaging.

In other jurisdictions, ADF's have been levied on a variety of items including oil, tires, white goods, and packaging.

Study Recommendations:

A consideration of the three identified goals that New York City could pursue using ADFs suggests the potential value of three sets of targeted commodities. These commodities are targeted based on precedents from other states, New York's waste stream, and on consumer behaviors and trends. The following summary outlines a promising ADF construct for DOS to consider:

Goal #1: Revenue Generation

Packaging, white goods (*e.g.*, refrigerators, washers and dryers, and other large [often white] appliances) and tires are candidate targets for a revenue-generating ADF. Packaging comprises approximately 35% of the City's waste stream. White goods and tires account for 1% and 2%, respectively.

Packaging, especially secondary and distribution packaging, represents a large component of the waste stream that is largely preventable and thus is a promising target for an ADF. Through a packaging ADF the City can generate revenue for waste prevention, recycling, and management programs and can simultaneously discourage excessive packaging. Rather than pursuing new legislation, the City or State might alternatively draw on existing legislation to achieve its goals. Section 1201 (f)(1) of the New York State Tax Code provides authority to impose a tax on all forms of packaging. By utilizing this existing law, the City could achieve the same goals as those that could be realized through the imposition of an Advance Disposal Fee on packaging.

White goods are another promising target for an ADF because these products tend to be large and costly for the City to dispose. An ADF can help offset some of the disposal cost and raise community awareness of the City's management and disposal costs for white goods. An ADF on these products also could, if it were set high enough, encourage repair and reuse of white goods, rather than disposal.

Tires offer another promising target for an ADF. They represent a significant litter problem and are costly to collect and manage. An exemption could be provided from the ADF for consumers who purchase long-life tires, thus promoting waste prevention.

Goal #2: Discourage Consumer Purchase of Hard-to-Dispose Products or Disposable Products for which Cost-Competitive Durable Alternatives are Readily Available

Disposable food service, disposable bulk beverage dispensers (bag-in-boxes), one-way pallets, disposable diapers, disposable razors and paperboard beverage containers all are examples of commodities that could be targeted for ADFs. These and related commodities constitute a significant portion of the City's waste stream which could be prevented through the purchase and use of durable alternatives. By levying an ADF on these commodities, the Federal, State or City government could raise revenues and discourage the use and purchase of these disposable and hard to manage items. In addition, the anticipated resistance of manufacturers, retailers, and consumers would raise consumer consciousness about the waste management impacts of their purchasing behaviors.

Goal #3: Encourage Manufacturers to Reduce Packaging and/or Increase the Recycled Content of Targeted Products and/or Packaging

This strategy for ADF establishment parallels the objectives and measures covered under Minimum Content Standards, discussed in the next section. It further serves the purpose of helping to stabilize markets for recycled materials, specifically recycled material diverted from the New York City waste stream. Possible targeted commodities are paper products, plastic office supplies, plastic bags, and other products or packaging. An ADF on these items could provide for an exemption for those that meet certain minimum content standards. Through this construct the Federal government, New York State, or New York City would generate revenue, encourage the sale of recycled-content products, and promote packaging reduction.

Implementation Challenges:

The ADF approach to waste prevention carries a high administrative cost and promises to evoke substantial resistance from manufacturers, distributors, retailers and consumers. However, in the case of packaging, New York State law already provides for a tax which, if it were to receive attention from policy makers, could at a minimum initiate dialogue among all affected parties and serve as a test case for the effectiveness and utility of ADFs.

Minimum Content Standards

Basic Premise:

The basic premise of Minimum Content Standards is to encourage the use of recycled material in products and packaging, and in so doing to increase the value and enhance the stability of markets for materials collected by municipal recycling programs.

Study Recommendations:

Through a review focusing primarily on state minimum content standard programs, a consideration of New York City's waste stream, and review of logical opportunities for promoting affirmative procurement, SAIC identified a number of commodities for which minimum content standards are appropriate. The recommended standards, based primarily on Federal Procurement Guidelines and California's Minimum Content Standards, are summarized below. In addition, based on consideration of the preponderance of textiles in the New York City waste stream, SAIC further recommends that DOS consider proposing or supporting a Federal or `NY State minimum content standard for rag paper with a specified post consumer content.

Commodities	Products	Recommended MCS and Implementation Schedule
Paper Products	• Public Utility Bills	1998: 50% total recovered content; 10% post-consumer content
	• Catalogues Mailed at Bulk Rate	2000: 50% total recovered content; 30% post-consumer content
	• Weekly Magazines (circulation greater than 250,000 in NY State)	
Plastic Products	• Plastic Trash Bags	1998: 10% recovered content for bags greater than 1.0 mil thickness
	• Plastic Retail Bags	2000: 20% recovered content for bags greater than .75 mil thickness
		2002: 30% recovered content for bags greater than .75 mil thickness
	• Rigid Plastic Containers	2000: 25% post-consumer recovered content
Glass Products	• Glass Beverage Containers	2000: 35% post-consumer recovered content
		2005: 50% post-consumer recovered content
	• Fiberglass Insulation	2000: 20% recovered glass cullet
		2005: 25% recovered glass cullet

Implementation Challenges:

Given the ultimate objective of diverting waste from the New York City waste stream and promoting markets for recyclables originating in the City, the major implementation concern regarding the proposed minimum content standards lies in the difficulty of ensuring that the recyclables that will be used in product manufacture are derived from New York City sources. If manufacturers of the targeted products are located in proximity to these material sources and if the commodities derived from City sources are cost-competitive, the imposed MCSs will serve their primary objectives of diverting waste from the City and stabilizing markets for NYC-derived recyclables. Two paper mills that will utilize NYC-derived recovered paper are either planned or under construction in Staten Island and the Bronx. Plastics manufacturers are located throughout the Northeast.

Manufacturer/Shared Responsibility

Basic Premise:

Either of these two approaches will shift responsibility for financing the management of packaging wastes. Manufacturer Responsibility shifts responsibility to the manufacturers of products and packaging; Shared Responsibility distributes responsibility more equitably among manufacturers, distributors and taxpayers. Implementation of Manufacturer Responsibility in Germany appears to have dramatically reduced packaging waste, increased recycling rates, and shifted costs from government and its taxpayers to industry and consumers. Criticisms have focussed on the costs to industry and perceived lack of sufficient recycling markets for collected materials.

Study Recommendations:

New York City should consider proposing and participating on a Federal- and/or State-sponsored study panel to develop a logical approach and time frame for shifting responsibility for either financing of packaging waste management or physical packaging waste collection and management, including financing, from cities to industry.

Depending on the recommendations of the study panel, legislation might be pursued requiring manufacturers to underwrite a portion, if not all, of the costs of municipal solid waste management as has been occurring abroad. At least a portion of these increased manufacturer costs would likely be passed on to consumers in the form of higher product prices.

New York State or City might also consider pursuing limited Manufacturers' Responsibility, such as proposing or supporting legislation addressing particular "problem" wastes, such as tires.

New York City might also, or alternatively, pursue utilization of Section 1201 (f)(1) of the New York State Tax Code, which provides authority to tax all forms of packaging, as a mechanism to encourage industry participation in developing either Manufacturer or Shared Responsibility.

Implementation Challenges:

Industry may initiate legal action based on restrictions to free trade. The Federal government, NY State or the City, depending on what level of government may pursue enactment of Manufacturer/Shared Responsibility may be subjected to significant legal and administrative costs. The necessary collection, processing and recycling infrastructure for many materials may need further development to facilitate effective implementation.

Conclusion:

Of the five programs summarized in this paper, the Expanded Bottle Bill may offer the greatest potential waste diversion and cost savings to the City based on avoided disposal and reduced management responsibilities. Both Minimum Content Standards and Advance Disposal Fees have extensive State level precedents; Minimum Content Standards also have been implemented at the Federal level. These precedents make implementation of policies targeting specific commodities of concern both promising and potentially feasible.

While these initiatives examined in this report may meet varying levels of resistance from manufacturers, distributors, retailers and consumers, as described in the larger policy documents, Manufacturer and Shared Responsibility likely have the greatest potential to fuel political opposition. However, Manufacturer Responsibility has the potential to shift financial responsibility from the City to the manufacturers and to focus consumer attention on the costs and complexity of waste management.

Advance Disposal Fees

I. Analysis of Advance Disposal Fees (ADF)

This paper provides a summary of the information gathered and research conducted on Advance Disposal Fees (ADF). Section I of this report provides a review of ADF programs, including the history of ADF programs, effectiveness of ADF legislation, implementation problems and discussion of the positions of those opposed to ADF programs. Section II provides a discussion of the potential impact, on New York City, of implementing an ADF in New York. A review of the ADF program implemented by the State of Florida is included in Section III.

A. Description

An Advance Disposal Fee (ADF) is a tax on the manufacture or consumption of a particular product. The effect is to raise the price of the product or package on which the fee is assessed. An ADF may be used to target a particular type of product or packaging for source reduction, recycling, and/or recycled content by effectively making that product or package more expensive. For example, if the ADF is large enough and depending on how it is structured, a fee on packaging could promote waste prevention by providing an economic incentive for manufacturers to eliminate, reduce, or switch to more reusable packaging in order to avoid paying the fee.

An ADF also may be viewed as a policy tool for influencing manufacturers' process or material content decisions to promote the manufacture of products or packaging that are more recyclable and/or contain recycled content. For example, an ADF may be placed on all writing paper containing less than 50 percent recycled material content. By increasing the price of paper containing less than 50 percent recycled content, consumers will favor the product containing 50 percent recycled content, and manufacturers will have an incentive to manufacture this product. Of course, it is essential that the ADF be set at a price or rate high enough to encourage the desired behavior or render the desired result in the marketplace. If the fee is set too low, manufacturers may find it easier and less costly to pass on a modest price increase to consumers of the product made with virgin materials rather than to increase their use of recycled materials. The result is the generation of revenues from the collection of fees, but almost no change in manufacturer behavior or waste generation practices.

An ADF on a product or group of products can raise revenues to fund environmental programs. If this is the primary goal of the ADF program, rather than to serve as an incentive to alter the behavior of manufacturers or consumers, the amount of the fee is of less importance. The fee should be set at an amount sufficient to raise the required level of revenue to support the environmental program.

An ADF is more flexible than other policy alternatives such as minimum content standards or utilization rates. With an ADF, manufacturers (and consumers) can always choose to pay the tax (or increased price) rather than increase their use of an alternative product or the use of a recovered material.

The point of levy can occur at any point along the production, distribution or retail chain. When an ADF is placed on a particular commodity at the point of manufacture, the manufacturer may either pay the tax or alter its production process to comply with the condition of the ADF (*e.g.*, include the required amount of recycled content within the manufacture of the product or packaging). Either decision on the part of the manufacturer almost always will result in the increase in the cost to the manufacturer being passed forward to the consumer in the form of an increased price for the commodity. This increase in the price of the product may result in a decrease in consumer demand, depending upon the amount of the price increase and the prevailing market conditions (*e.g.*, total number of manufacturers and distributors supplying the product, the availability of cheaper substitute products, the overall elasticity of demand for the product on which the ADF is levied). The manufacturer's decision and the resultant change in the price of the commodity to the consumer (and therefore any change in demand) will depend upon several factors, including:

1) Which alternative is cheaper for the manufacturer. If it is cheaper for the manufacturer to pay the tax than to re-tool its manufacturing process and obtain a sufficient supply of recovered materials, the manufacturer will continue to produce the product using virgin materials, and pass the cost of the tax onto the consumer. If it is cheaper for the manufacturer to re-tool and obtain recovered materials, the manufacturer will alter its production behavior and manufacture the commodity using recycled material content. The change in manufacturing cost will be passed on to the consumer in the form of a higher price. Any subsequent change in consumer demand will depend on the relative change in the price of the regulated commodity compared to the price of similar or substitute commodities.

   A manufacturer, depending upon its competitive position in a given market, may or may not pass the full change in cost associated with the ADF onto the consumer. In some markets, different manufacturers may hold different competitive positions which may alter the amount of the change in cost due to the ADF that is ultimately passed on to the consumer. For example, if one or a few manufacturers in a given market are in a better position to procure a more favorable (and less costly) supply of recovered material content, the manufacturer(s) may be able to offer the product at a lower price than other manufacturers of the same product that are faced with more costly alternatives for procuring a supply of recovered materials. In this case, the manufacturers with the larger supply cost, may choose to absorb the difference in supply cost and meet the price offered by the manufacturer that can procure a less expensive supply of materials. In any case, the increase in price should not be higher than the per unit cost of the ADF. Again, any change in consumer demand will be dependent upon the relative change in the price of the regulated product compared to the price of available substitute products (as well as the elasticity of consumer demand for the product on which the ADF is levied).

2) The ability of consumers to purchase the same product from a manufacturer located in a different jurisdiction at a lower price. If consumers can purchase the same product in a different location without incurring a significant cost in commuting to the other jurisdiction, the manufacturer distributing/selling the product in the jurisdiction that levies the ADF may be forced to absorb all or part of the increase in cost due to the

ADF to remain competitive with manufacturers distributing/selling the same product in nearby jurisdictions. Initially, consumer demand for the product in the local market may decrease. However, any significant decrease in demand may be met with an adjustment in price due to the manufacturers' (and distributors') willingness to absorb some of the increase in cost. On the other hand, an ADF that results in a significant increase in cost beyond that which the market is able or willing to absorb will result in a permanent decrease in the supply of the product.

3) The availability of substitute products or packaging that are not affected by an ADF. If a comparable or substitute material can be used by the manufacturer in the production or packaging of a product, the manufacturer will avoid paying the ADF altogether by using the alternative material or package (*e.g.*, switch from a plastic container to a glass or aluminum container, if an ADF is levied on plastic, but not on aluminum or glass). In effect, the supply of the regulated product will diminish. This result may be favorable for the state or community, if the ADF results in a reduction in the use of a commodity that is more toxic or has a low recycling rate to a commodity that is less toxic or has a higher recycling rate.

The major disadvantage to the implementation of an ADF is the administrative costs associated with assessing the fee and monitoring compliance with the program. In addition, it is not possible to assess an ADF on products imported by consumers from outside jurisdictions. The ability of consumers to travel outside of a given jurisdiction to purchase the same commodity at a lower price and import the product to the jurisdiction may render an ADF policy ineffective as both a source reduction tool and a revenue generating program.

Proponents believe that ADFs encourage manufacturers and packagers to consider the future disposal cost of products and product packaging and encourage them to consider products and packaging that are recyclable or reusable and therefore not subject to the ADF. ADFs also may encourage manufacturers to increase the amount of recycled content material in their products, product packaging or containers, resulting in an increase in demand for recovered materials. ADF legislation sets the recycling rates that manufacturers must achieve and maintain to be exempt from the ADFs. Both public and private recycling efforts may benefit from improved markets for the recycled materials.

Exhibit 1 describes four potential bases for levying ADFs: weight, volume, item and price.

From an administrative perspective, the price and item-based levies that relate only to the number or price of items sold are most feasible to implement and administer. Although weight- and volume-based fees are more directly related to the actual impact the products have on the solid waste stream, the tremendous number of individual calculations make this type of ADF program very complex because of the myriad of products in the marketplace for which separate fees must be assessed.

Fees collected, as a result of ADFs, can provide revenue for states to invest in their solid waste management infrastructure. Exhibit 2, at the end of Section I, provides a summary of current state ADF programs, including how the fees are collected and distributed.

Some states enact similar fees but do not regard them as ADFs. The difference lies in the application of the accrued funds. For example, New York State levies a $0.02 "tax" on nonrefillable beverage containers. According to Gus Ribeiro, NY State Department of Environmental Conservation, the tax is not considered an ADF by the State because the revenue collected is not directed toward environmental programs or toward covering the costs associated with waste management of the material. The revenue is returned to the general fund.

Exhibit 1: Potential ADF Levy Basis

Weight-Based Levy: Calculate the ADF using a per ton rate as the assumed/actual disposal (tipping and hauling) cost.

Volume-Based Levy: Use national data on the volume of packaging in landfills to develop estimates based upon waste volume. Adjust weight-based fees by a weight-to-volume ratio.

Priced-Based Levy: Apply a fee equal to a percentage of the consumer price.

Item-Based Levy: Apply the fee on specific products or packages.

In summary, an ADF will effect market behavior by leading manufacturers to choose the least cost option. Changes in consumer demand will reflect changes in the relative price of the product compared to the price of similar products. Manufacturers' supply of a given product will respond to both consumer demand and the price and availability of substitute materials for producing the product. Therefore, it is important that government officials study a particular market situation prior to establishing an ADF to ensure that the ADF is set at a level that will cause the desired result. If the fee is set too low, manufacturers will choose to pay the tax and continue to produce the commodity using virgin materials or the same ratio of virgin materials to recovered materials that was used prior to the ADF. The only result of the ADF will be collection of additional revenues (which in some cases could be less than the rather high administrative costs associated with collecting fees and program monitoring).

B. Effectiveness of ADFs

The ADF program in Florida did achieve its goal of increasing recycling and encouraging manufacturers to increase the use of recycled feedstock in the manufacture of containers, creating new businesses and new jobs within the State. Aluminum and steel were exempt from the onset of the program due to the high recycling rate for containers made with these materials. Over the course of the program, through either increased recycling, increased usage of recovered content or through a take-back provision, all plastic coated paper containers and glass containers, 99 percent of the plastic soft drink containers, 93 percent of plastic milk jugs and more than 80 percent of the containers of motor oil and antifreeze earned an exemption from the program.[1]

In Rhode Island, the ADF program improved the recycling rate for used oil. Funds collected under the program are used to promote collection programs, to purchase collection igloos, to support household hazardous waste collection and to build sites to house the used oil and antifreeze collection igloos. In addition, Rhode Island uses the funds collected from the ADF on tires to assist businesses that offer innovative methods for removing the second largest accumulation of tires in the U.S. Rhode Island also funds, from its ADF, litter collection programs operated by the RI Department of Corrections, RI Department of Environmental Management, and by cities and towns.

[1] Department of Environmental Protection Press Release, *Florida Containers Exempted From ADF*, June 22, 1994.

ADF legislation can generate revenue, and require states and/or locales to allocate these funds for programs and grants designed to address solid waste management issues. For example, Florida's ADF program generated $44.6 million in revenues and funded programs throughout the State. Small county landfills received $15 million, recycling market improvement projects received approximately $6 million, surface water improvement programs received $8 million, small community sewer construction received $3.8 million and $13 million was allocated for sewage treatment revolving loan programs. In Hawaii, the State uses the fees to fund county glass recovery programs. The money necessary to establish solid waste management programs targeting specific consumer products would not be available from the state's general revenue.

C. Implementation

Problems associated with the implementation of ADF programs vary according to the individual program. Problems can range from administrative burdens on the entity responsible to collect and disburse the funds collected to public perception of an ADF as "just another tax."

For products that have existing taxes, such as tires and automobiles, it is easier to design and implement an ADF program. The tracking and reporting mechanisms are in place and retailers are adept at processing the tax revenue. For commodities that are not currently taxed, and for which there are no reporting mechanisms, levying an ADF at the retail level can be burdensome. Prior to determining how to implement an ADF on any specific product(s) or packaging, comprehensive research is important to identify potential problems that may arise and how the revenue collected will be allocated. There also may be implementation problems associated with the programs (*e.g.*, recycling programs, market development initiatives, etc.) that are funded with revenues collected from the ADF program. Currently, there do not appear to be quantitative measurement tools in place to monitor and report the success or failure of programs funded with ADF revenue.

D. Opposition

The greatest opposition to a fee or perceived tax can be expected to come from the entity responsible for paying the fee. Obviously, when consumers are faced with paying the fee at the point of retail sale they may perceive the fee as an additional tax or the "newest tax" designed to raise additional money to fund a bigger government. This may be mitigated by initiating the fee at the point of manufacture, and by policy makers highlighting how the fee only applies when industry sells products that do not meet the specifications for reuse, recyclability and/or recycled content. And, even when consumers choose to buy items that do not meet the standards, consumers can be made aware that the funds raised from the ADF are used for waste management services that would otherwise have to be financed from other taxes. The environmental benefits of ADFs can also be highlighted to counter potential consumer opposition.

Industry is concerned with its ability to remain cost competitive. Industry representatives fear that consumers may purchase an alternative product if the container is not subject to the ADF and, therefore, the product is less expensive.

The Florida Public Interest Research Group (Florida PRIG) and the National Environmental Law Center (NELC), prior to the implementation of the ADF program, developed a report entitled *The ADF: A Design Failure*. The report summarized the potential problems with Florida's program as follows:

> "The ADF fails to provide consumers with convenient access to recycling and adequate incentives to recycle, will burden consumers with a new tax and government with costs and added bureaucracy, divorces industry from taking responsibility for wasteful products and packaging, and fails to provide industry with sufficient incentives to modify its behavior in the interest of recycling . . . The ADF is simply a container tax, the proceeds of which may or may not be used wisely to assist recycling efforts."[2]

The Florida legislature responded to concerns raised by the public and by special interest groups and amended the original ADF program. For example, the point of collection was moved from the retail to wholesale or point of first importation into the State. In addition, the emphasis was broadened to include both collecting recyclable materials and improving the markets for recyclable materials. The legislature reallocated the fee proceeds and eliminated the redemption process.

Solid waste management officials and other executives in state and local government may oppose an ADF that limits their ability to target programs and allocate revenues to fund the selected programs. Restricting the use of the revenue generated by the ADF may be too limiting and may not allow a solid waste management official or staff managing state environmental programs the ability to effectively budget and fund environmental and waste management programs.

E. Proponents

When ADFs are used to raise funds to underwrite costs of waste prevention and waste management programs, this funding can substitute for municipal budgets raised from local property taxes and other local taxes. Therefore, fiscal monitors, municipal bond raters and those favoring lower taxes are likely allies of a state ADF.

In addition to environmental advocates, the general public/taxpayers may support an ADF since it is industry that profits from the product sales, and consumers who benefit from their decision to purchase products that may be subject to an ADF. Therefore, an ADF may be deemed by many to be more equitable than the present system of passing the full burden of waste management costs to municipalities and taxpayers, while also providing incentives for waste prevention and recycling — expanding recycling markets by promoting sale of products that are recyclable and/or contain recycled material.

[2] Bill Wood, Geoff Lomax, Lauri Aunan, *The ADF: A Design Failure*, The Florida Public Interest Research Group, National Environmental Law Center, September 1991.

Exhibit 2: Overview of Selected ADFs and Similar Tax Programs in the United States

STATE:	Arizona
Commodity:	**Advance Disposal Fee:**
Tires (1991)	Levies a two percent fee on new tires sold. Used tires must be recycled. The revenues are used to fund grant programs for waste tire management activities.
STATE:	Arkansas
Commodity:	**Advance Disposal Fee:**
Tires HB 1455 (1993)	Fee of $1.50 on new tire sales and $1.00 on waste tires imported into the State, if waste tires are deposited in a permitted waste tire processing facility. Fees are deposited in the State Treasury as special revenues and are then credited to the "Waste Tire Grant Fund." Grant money is used to manage existing waste tires and/or to develop new waste management alternatives.
STATE:	California
Commodity:	**Advance Disposal Fee:**
Tires SB 718 (1995)	A $.25 per used tire fee is levied on all tires returned for disposal. There is a bill pending to levy the fee at the point-of-sale. The revenue funds tire pile cleanup and market development programs.
Used oil AB 2092 (1992)	There is a $.04 per quart redemption fee applied to the purchase of oil. Consumers receive a rebate of the fee when they return the oil for recycling.
STATE:	Colorado
Commodity:	**Advance Disposal Fee:**
Tires HB 1318 (1993)	A recycling development fee of $1.00 per new tire when the owner of the tire delivers the waste tire to a retailer of new tires for disposal. Retailers of new tires collect the fee and submit it to the Department of Revenue. The retailer may retain from the fees collected an amount equal to the retailer's direct cost in complying with the regulation which shall not exceed three and one-third percent of the fees collected. The Department of Revenue shall then transmit the fee with a report of direct and indirect costs for compliance to the State Treasurer who shall credit the Waste Tire Recycling Development cash fund.
STATE:	Florida
Commodity:	**Advance Disposal Fee:**
Containers, Tires (1993)	In 1993, the Florida State Legislature implemented ADFs broader in scope than any other ADF program in the U.S. Florida implemented a system to levy ADFs on all containers, defined as a bottle, can, or jar, that are greater than five ounces and less than one gallon and sealed by the manufacturer. Section III of this report, provides additional information on Florida's ADF program. Fees collected fund recycling and other State solid waste management programs. The ADF was allowed to sunset in 1995.
Newsprint HB 461 (1993)	A product waste disposal fee of 10 cents per ton of newsprint consumed is imposed on producers and publishers. The fee is based on the total weight of newsprint actually consumed in the publications. A credit of 10 cents per ton is allowed against the fee obligation for every ton of recycled newsprint used in the publication of products. The fee is rescinded when the quantity of newsprint, sold in the State, achieves a 50 percent recycling rate. The fee and credits will increase to 50 cents per ton if the recycling rate does not achieve 50 percent.

Exhibit 2 (continued): Overview of Selected ADFs and Similar Tax Programs in the United States

STATE:	Georgia
Commodity:	**Advance Disposal Fee:**
Special Waste (out-of-state waste) **This law was declared unconstitutional and is no longer on the books.**	$10/ton fee levied on owners and operators of facilities treating, storing, or disposing of special waste generated outside of Georgia's boundaries. The revenue is deposited into the state's solid waste fund.
Tires (1993)	$1.00/tire fee was imposed upon the retail sale of tires. The fee is deposited into the State Treasury to the account of the general fund.
STATE:	Hawaii
Commodity:	**Advance Disposal Fee:**
Glass (1994)	In 1994, Hawaii adopted legislation that requires importers of glass containers to pay an ADF of 1.5 cents per container until September 1996. Hawaii will then review the ADF program and set a fee that will generate revenue to fund programs to achieve a 25 percent recovery of glass by the end of 1996 and 50 percent by 1998.
Proposed: White goods, motor vehicles and beverage containers	Senate Bill 3227, introduced and assigned to the House Transportation and Ways and Means committees, will place an ADF on white goods and motor vehicles. Each county will collect the funds and use them for disassembly and proper disposal of these large items. House Bill 3194, assigned to House Energy and Environmental Protection and Finance committees, will place an ADF of $.05 per beverage container. The bill also specifies that consumers will be reimbursed at redemption centers.
STATE:	Idaho
Commodity:	**Advance Disposal Fee:**
Tires (1993)	$1.00 fee charged on all new tires purchased as of 1993. The waste tire collection sites are funded by grants from the Waste Tire Grant Fund.
STATE:	Illinois
Commodity:	**Advance Disposal Fee:**
Tires	$1.00 fee charged on all new tires purchased. Of the estimated $12 million generated, 10 percent is returned to the retailers to compensate for administering the program, 10 percent is allocated to the IL Department of Revenue to cover administrative costs and the remaining 80 percent is used to fund tire pile cleanup programs.
Proposed: Beverage Containers	A Bill introduced 2/7/96 will place an ADF on containers that have a recycling rate less than 50 percent. Also will place a five cent deposit on beverage containers (Bill not likely to pass.)
STATE:	Indiana
Commodity:	**Advance Disposal Fee:**
Tires HB 1427 (1993)	A $0.25 fee is collected on new tires. Fifty percent of the revenue collected funds market development programs and the other 50 percent goes toward covering the costs associated with programs to address illegal dumping.

Exhibit 2 (continued): Overview of Selected ADFs and Similar Tax Programs in the United States

STATE:	Iowa
Commodity:	**Advance Disposal Fee:**
Tires HB 2475 (1992)	A fee is collected on new tires and used to fund a collection program.
STATE:	Kansas
Commodity:	**Advance Disposal Fee:**
Tires	A $0.50/new tire fee is collected at the retail level. According to the Department of Revenue the money is used to pay for tire disposal.
STATE:	Nebraska
Commodity:	**Advance Disposal Fee:**
Hard-to-Dispose of Products LB 444 (1993)	A fee of $150 per $1 million dollars of revenue for products (waiting for info. from state) that contribute to the waste stream.
STATE:	Nevada
Commodity:	**Advance Disposal Fee:**
Tires AB 386 (1993)	A $1.00 per tire fee is assessed on all new tires.
STATE:	North Carolina
Commodity:	**Advance Disposal Fee:**
White Goods SB 60 (1993)	A $5-10 per unit fee is collected on white goods. White goods were banned from landfills effective 1/1/91 and incineration was banned effective 7/1/94. In 1994-1995, 312,000 tons of white goods were received at county collection sites. This is up from only 34,000 tons in 1993-1994. The increase in the collection probably indicates a reduction in illegal dumping. $7.5 million in revenue was generated with $5.5 million returned to the counties to pay for white goods management. The remaining revenue is returned to the Solid Waste Management Trust Fund and is used to fund technical assistance projects, educational activities and provide funding for local waste reduction and recycling programs.
Proposed: Plastic Containers	Bill to place an ADF on plastic containers was amended to a study bill. The soft drink industry is willing to tolerate ADFs if it means that there will not be any deposit legislation or beverage packaging fees.
Tires HB 83 (1993)	As of 10/93, the revised privilege tax is imposed on a tire retailer at the rate of two percent of the sales price of each new tire (less than 20 inches) sold and a one percent tax on tires greater than 20 inches. The tax proceeds are allocated as follows: the Department of Revenue retains money to cover the cost of collecting the tax (not to exceed $225,000), 10 percent of the remaining revenue is divided between the Solid Waste Management Trust Fund and the Scrap Tire Disposal Account and the remaining 90 percent of the proceeds are distributed to the counties to establish at least one scrap tire disposal site in each county. Tires on new automobiles are exempt from the privilege tax.

Exhibit 2 (continued): Overview of Selected ADFs and Similar Tax Programs in the United States

STATE:	Rhode Island
Commodity:	**Advance Disposal Fee:**
Oil, Antifreeze, Organic Solvents, Tires, Automobiles	Rhode Island collects a wholesale tax, on materials that are considered hard to dispose: $0.05/quart on oil, $0.10/gallon on antifreeze, $0.0025/gallon on organic solvents, and $0.50/tire. Three dollars per automobile is collected when titles are issued by the Rhode Island Department of Motor Vehicles. The tire fee revenue provides funding to businesses working to clean up tire disposal sites. The fees collected from other hard-to-dispose items is used to operate household hazardous waste collection centers and oil collection programs.
Taxable Food and Beverage	A litter participation fee is levied on all taxable food and beverage. The fee is accessed based upon the total gross receipts of the business and ranges from $25 per year for businesses with gross receipts from $0 - $15,000 to $250 per year for businesses with gross receipts up to $3 million. The revenue generated from the fees is used to fund litter reduction and recycling programs in the State.
Containers	A fee of $0.04/case is assessed on beverage containers and the revenue is used to fund litter control and recycling programs.

II. Potential Impact of Implementing ADF Programs in New York City

The following section of this report is designed to provide information that can be used to determine the feasibility of implementing ADFs in New York State and the impacts on the City. The criteria for making a determination include legal and administrative barriers, impact on the City's economy, amount of waste that will potentially be diverted from the City's waste stream, cost per ton of waste utilized or diverted and the impact ADFs may have on the markets for recyclable materials.

A. Legal and Administrative Barriers

The purpose of this summary is to analyze the legal and administrative barriers on the City of New York of an ADF implemented by the State. The ADF programs highlighted in Section I.A are legislated by the State.

An ADF program that targets containers, similar to Florida's program, places an administrative burden on the staff responsible for monitoring and tracking the revenue and reporting requirements associated with the program. For example, to identify all containers sold throughout the City and to levy a fee on those containers is a monumental task. Levying the fee on containers sold in NYC at any point poses a challenge. For example, a wholesale or point of import into the City fee would place a tremendous administrative burden on companies doing business in the City. The easiest way for New York City to track and administer an ADF would be to place the ADF on a commodity/product that currently is taxed (*e.g.*, tires).

There are many states that have ADF programs targeting tires and used oil. There are other products that New York could consider imposing an ADF upon including; antifreeze, white

goods and fluorescent bulbs and other hard-to-dispose-of consumer products. A great deal of research is required to identify the administrative barriers posed by placing an ADF on any specific consumer product.

B. Impact on NYC's Economy

An ADF placed on a commodity within a single state or local region could result in an increase in the price of the commodity in that state or locality compared to the price of tires in surrounding regions. If the resultant change in price is significant, consumers may travel to regions and localities outside of the taxing jurisdiction to purchase tires (or other commodities).

However, the total effect on local demand for a given product due to any local price increase will depend on the relative difference in price in the two markets compared to the cost to the consumer of having to travel outside the local market to obtain the cheaper product, and the overall elasticity of consumer demand for the product. In some cases, consumers may find that they can do without the product, or may delay purchases (*e.g.*, change tires less regularly). Also, the demand for products that often are bought with discretionary resources and are not necessities may decrease more dramatically, as a result of price fluctuations, than the demand for products that are of greater necessity to consumers.

Other factors influencing changes in consumer demand are the percentage change in the total price of a product caused by an ADF and the frequency in which the products are purchased. In the case of tires, which are relatively expensive commodities that are not purchased by individual consumers on a frequent bases, individual consumers may be unaware of small changes in the price. A large percentage change in the price of a product that is bought on a more frequent basis (*e.g.*, soft drinks) may result in a more dramatic decrease in overall consumer demand for the product within the jurisdiction levying the ADF.

The following case studies illustrate the potential impact of an ADF on NYC's economy, in general terms. ADFs can impact the City's economy on several levels and can have both a positive impact and a negative impact, depending on which aspect of an ADF program is being addressed. For purposes of this paper, we selected tires and household batteries, to provide NYC with an overview of the potential impact of ADFs. The examples are presented in Exhibit 3.

Exhibit 3: Sample Case Studies of Products Targeted for an ADF Program

TIRES	HOUSEHOLD BATTERIES
Summary: More than 2 million tires are discarded in NYC each year.[1] The potential exists for 2 million replacement tires to be purchased annually. Scenario: The State of NY levies an ADF of $1.00 per tire on all new tires, which is collected at the retail outlet. More than two million dollars in ADF revenue will be collected and placed in a restricted receipt account. The revenue could be allocated as follows: 25% Cleanup of existing tire piles in NYC. 25% Back to boroughs to fund tire pile cleanup projects, environmental education programs and collection programs. 25% Market Development Programs. 25% Recycling Programs Exempt: To encourage tire manufacturers to extend tire life, support the retread industry and encourage consumers to purchase both longer-life tires and retreads, provide an exemption from the ADF for longer-life and retread tires.	Summary: There are approximately 73,200,000 consumer batteries sold in New York City each year.[2] Scenario: The State of NY levies an ADF of $0.02 per non-rechargeable household battery at the wholesale level or point of first import into the State. The revenue will be collected and placed in a restricted receipt account by NY State. The State could allocate the revenue as follows: 40% Development of collection systems and equipment. 35% Back to local governments to fund environmental education programs and collection programs. 25% Market Development Programs. Exempt: Provide an exemption for rechargeable batteries (defined as batteries that can be recharged up to 10 times) and for the products of manufacturers that set up a take-back system.
Impact on NYC Economy (See note at end of exhibit): The impact will be minimal. NYC consumer population will have $2 million less to spend on other products/services in the City. However, a portion of the ADF will come back to the City from the State, allocated for environmental and waste management programs. Providing an exemption for retreads and longer-life tires may increase sales of these items. An ADF of $1.00/tire probably would not result in a loss of tire sales to neighboring states.	Impact on the NYC economy: The impact on the NYC economy is minimal in terms of reducing the disposable income of individual consumers. However, the revenue returned to the City for use in developing the infrastructure necessary to establish effective recycling programs and to efficiently manage discarded batteries may total more than $1.4 million annually. Levying the fee at the wholesale level imposes an administrative burden on distributors and a massive burden on State employees responsible for tracking and managing the revenue generated as a result of the ADF.

[1] Number of vehicles is based on 1993 NYS DMV figures for vehicles registered in New York City.

[2] Number derived using information contained in the New York State Department of Economic Development Secondary Materials Program, *Getting a Charge Out of the Waste Stream*, Office of Recycling Marketing Development, 1992.

Exhibit 3 (continued): Sample Case Studies of Products Targeted for an ADF Program

TIRES	HOUSEHOLD BATTERIES
Anticipated Level of Waste Diversion: The amount of waste diverted will depend on the number of consumers who opt to purchase retreads or longer-life tires to replace the discarded tires. Both the price of a longer-life tire and the perceived quality of retreads are variables that will contribute to reducing the level of waste diverted from the waste stream. The ADF will have minimal impact on how consumers elect to discard their old tires. However, using ADF revenue, the City can improve existing waste management practices to more effectively manage the tires in the waste stream.	Anticipated Level of Waste Diversion: The ADF can have a tremendous impact on the number of household batteries that are discarded into the waste stream as consumers purchase more rechargeable batteries and as effective battery recycling programs are developed. The City can use the revenue from the ADF to design and implement efficient, convenient collection sites for household batteries. The number of household batteries discarded into the waste stream will be reduced if manufacturers elect to implement convenient recycling programs or sell more rechargeable batteries. The City can use its ADF revenue to provide consumer outreach information designed to educate consumers both on the hazards of discarding batteries into the municipal waste stream and that a take-back program exists. The City also may develop a recycling program.
Impact on Cost Per Ton of Waste Utilized or Disposed: None	Impact on the Cost per Ton of Waste Utilized or Disposed: None
Impacts on Materials Market: The ADF may encourage the development of tires that far exceed the lifespan of any tire that is produced today. The market for retread tires may increase as a result of efforts by manufacturers to improve consumer confidence by developing reliable retreads.	Impacts on Materials Market: There is an opportunity to encourage manufacturers to develop longer-life batteries and improved rechargeable batteries. Consumers have the option of purchasing longer-life and rechargeable batteries which are exempt from the ADF program.

III. Overview of Florida's ADF Program

In 1988, the Florida Legislature elected to apply an ADF to containers that often are improperly discarded and disposed and that represent a significant solid waste and litter problem in the State. The initial purpose of the ADF was to encourage recycling. The containers targeted included all containers between five ounces and one gallon in volume, that were sealed by the manufacturer and that had not achieved an annual 50 percent recycling rate. The recycling rates for aluminum and steel containers exceeded the 50 percent recycling rate and, therefore, these containers were excluded from the ADF program from the onset.

In addition to the exemption based on a recycling rate, the legislation set forth other standards by which containers could achieve exemption from the ADF. For example, glass containers that met a recovered content goal of 35 percent, plastic containers meeting a 25 percent recycled content goal, and paper containers and product packaging, including aseptic containers, meeting a 30 percent recovered content goal were eligible for an exemption from the ADF. In addition, "take-back" provisions exempted companies that caused materials to be removed from the waste stream in Florida and recycled into other products in an amount equal to the recycled content goals.

The legislation provided definitions of terms, set deadlines for subjecting additional containers or product packaging to ADFs and set dates for submission of petitions requesting exemptions for specific containers and packaging materials.

The initial legislation specified a one-cent per container fee effective October 1, 1992. In early 1992, the program was delayed because in April 1993 the Legislature made substantial modifications to the legislation, as discussed below.

Specifically, the Legislature decided to assess the ADFs at the wholesale level (or the point of first importation into the State), rather than at the retail level as originally drafted, on all containers that had not achieved the specified recycling rate. It further elected to change the program goal from its focus on encouraging recycling to encouraging businesses to use recycled content in the manufacture of products sold in Florida. The ADF program emphasis was broadened from collecting recyclable commodities to encouraging manufacturers to use a higher percentage of recycled materials and to improve the markets for products containing recycled content. In addition, the redemption process that would have allowed consumers to return containers for a refund was eliminated.

The ADF took effect October 1993 and retailers were required to collect the fee. In October 1995, the fee increased to two cents per container.

According the Russ Martin, Florida Department of Environmental Protection, Florida received more than 173 petitions from businesses requesting product exemptions from the ADF program, based on the recycled material content. Florida DEP approved 105 petitions. More than 60 percent of the containers originally subject to Florida's ADFs earned an exemption from the fee by July 1, 1994, as a result of recycling efforts of consumers and increased use of recovered content by companies, according to DEP Secretary Virginia Wetherell.[3]

[3] Department of Environmental Protection, *Florida Containers Exempted From ADF*, Press Release, June 22, 1994.

In the program's first full year, Florida collected $44.6 million from ADFs. Exhibit 4 provides a breakdown of the fund allocations.

The ADF legislation, strengthened the State's recycling infrastructure and increased construction of processing facilities. For example, Piper Plastics located a plastics recycling facility in Florida, enabling the major dairies and soft drink companies to meet the 25 percent goal and exempt their products from the ADF. This allowed an exemption for plastic containers. The dairies and soft drink companies in turn, agreed to purchase commercial distribution products (*e.g.*, plastic delivery trays, plastic crates, etc.) from Piper Plastics.

Exhibit 4: Allocation of ADF Revenue in Florida (Percent per Program)

Program	Percent Allocated
Supplemental Grants	30%
Recycling Market Development	12%
Surface Water Improvement	19%
Sewage Treatment Loan Fund	27%
Small Community Sewer Fund	12%

A survey of petitioners in Florida indicated that they initiated recycling efforts as a direct result of the ADF because they believed that to remain cost competitive they required an exemption from the ADF program.

Aluminum and steel containers were never subjected to ADFs because, as demonstrated by the Can Manufacturers Institute and the Steel Recycling Institute, both had a sustained recycling rate of more than 50 percent. Paper and paper packaging achieved an exemption from the ADF program in July 1994 when the American Forest & Paper Association certified that the industry would demonstrate a sustained recovery rate of 30 percent, as required by the legislation.

Petitioners who applied for an exemption from ADF indicated that they increased their use of recycled content as a direct result of the ADF. Many companies increased the level of recycled content in their containers or switched to using recycled materials earlier than planned. Petitioners claimed that the ADF legislation had an influence equal to that of the energy savings potential, lower cost of recycled materials and the public relations gained by using recycled content materials in production of their containers.

A 1995 survey of Florida manufacturers undertaken by the Florida Department of Environmental Protection indicated that ADFs had a bigger impact on the take-back program, a program that exempts companies that cause material to be removed from the waste stream in Florida and recycled into other products in an amount equal to the recycled content goals, than on the recycled content of containers because 76 percent[4] of the petitioners already incorporate the use of recycled material in containers. The survey also indicated that the increase to two cents per container was a significant factor in seeking an exemption. Adding the 48 cent ADF per case of product in plastic containers was equivalent to spending the extra one to two cents, per container, it cost to incorporate 25 percent recycled content into the plastic containers.

According to Russ Martin, the Florida Legislature determined that the ADF program has "done its job" and elected to let the sunset provision take place in 1995.

[4] *Advanced Disposal Fee Issue Paper*, February 7, 1995.

IV. Conclusions/Policy Recommendations

An ADF is a fee levied on the distribution or sale of a specific product. The fee may be designed to achieve any or all of the three following goals:

1. To generate revenue to fund waste prevention, recycling and related environmental programs,
2. To discourage consumer purchase of hard-to-dispose products or disposable products for which cost-competitive durable alternatives are readily available, and
3. To encourage manufacturers to eliminate and/or reduce packaging, and/or increase the recycled content and/or recyclability of targeted products and/or packaging.

In other jurisdictions, ADF's have been levied on a variety of items including oil, tires, white goods, and packaging.

Study Recommendations:

A consideration of the three identified goals that New York City could pursue using ADFs suggests the potential value of three sets of targeted commodities. These commodities are targeted based on precedents from other states, New York's waste stream, and on consumer behaviors and trends. The following summary outlines a promising ADF construct for DOS to consider:

Goal #1: Revenue Generation:

Packaging, white goods (*e.g.*, refrigerators, washers and dryers, and other large [often white] appliances) and tires are candidate targets for a revenue-generating ADF. Packaging comprises approximately 35% of the City's waste stream. White goods and tires account for 1% and 2%, respectively.

Packaging, especially secondary and distribution packaging, represents a large component of the waste stream that is largely preventable and thus is a promising target for an ADF. Through a packaging ADF the City can both generate revenue for waste prevention, recycling, and management programs and can simultaneously discourage excessive packaging. Rather than pursuing new legislation, the City or State might alternatively draw on existing legislation to achieve its goals. Section 1201 (f)(1) of the New York State Tax Code provides authority to impose a tax on all forms of packaging. By utilizing this existing law, the City could achieve the same goals as those that could be realized through the imposition of an Advance Disposal Fee on packaging.

White goods are another promising target for an ADF because these products tend to be large and costly for the City to dispose. An ADF can help offset some of the disposal cost and raise community awareness of the City's management and disposal costs for white goods. An ADF on these products also could, if it were set high enough, encourage repair and reuse of white goods, rather than disposal.

Tires offer another promising target for an ADF. They represent a significant litter problem and are costly to collect and manage. An exemption could be provided from the ADF for consumers who purchase long-life tires, thus promoting waste prevention.

Goal #2: Discourage Consumer Purchase of Hard-to-Dispose Products or Disposable Products for which Cost-Competitive Durable Alternatives are Readily Available

Disposable food service, disposable bulk beverage dispensers (bag-in-boxes), one-way pallets, disposable diapers, disposable razors and paperboard beverage containers all are examples of commodities that could be targeted for ADFs. These and related commodities constitute a significant portion of the City's waste stream which could be prevented through the purchase and use of durable alternatives. By levying an ADF on these commodities, the Federal, State or City government could raise revenues and discourage the use and purchase of these disposable and hard to manage items. In addition, the anticipated resistance of manufacturers, retailers and consumers would raise consumer consciousness about the waste management impacts of their purchasing behaviors.

Goal #3: Encourage Manufacturers to Reduce Packaging and/or Increase the Recycled Content of Targeted Products and/or Packaging

This strategy for ADF establishment parallels the objectives and measures covered under Minimum Content Standards, discussed in the next section. It further serves the purpose of helping to stabilize markets for recycled materials, specifically recycled material diverted from the New York City waste stream. Possible targeted commodities are paper products, plastic office supplies, plastic bags, and other products or packaging. An ADF on these items could provide for an exemption for those that meet certain minimum content standards. Through this construct the Federal government, New York State, or New York City would generate revenue, encourage the sale of recycled-content products, and promote packaging reduction.

The ADF approach to waste prevention carries a high administrative cost and promises to evoke substantial resistance from manufacturers, distributors, retailers and consumers. However, in the case of packaging, New York State law already provides for a tax which, if it were to receive attention from policy makers, could at a minimum initiate dialogue among all affected parties and serve as a test case for the effectiveness and utility of ADFs.

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Expanded Beverage Container Deposit Legislation

I. Overview of Container Deposit Legislation

In response to the Mayor's decision to close the Fresh Kills landfill by December 31, 2001, the City of New York seeks alternative waste reduction and waste management approaches. One waste management option that has been debated by the New York State Legislature is the expansion, modification and elimination of the current container deposit system. This paper presents an analysis of the impact of beverage container deposit legislation in the United States and addresses the potential waste management and economic impacts for New York City of altering the current beverage container deposit legislation.

Beverage container deposit laws or "bottle bills" are government mandated, industry financed systems to recover beverage containers for recycling or reuse. Originally intended to reduce litter, traditional container deposit legislation requires distributors to recover empty beverage containers. A deposit of two-and-one-half to ten cents per container provides consumers with an economic incentive for returning each container.

Traditional container deposit legislation targets carbonated soft drink, water, beer and malt beverage containers, although wine coolers and cocktail mixes have been included in some states. Traditional bottle bills have been enacted in eight states: Connecticut, Delaware, Iowa, Massachusetts, Michigan, Oregon, New York, and Vermont and one municipality, Columbia, Missouri. Maine has established an expanded bottle bill which, in addition to carbonated soft drinks, water, beer and malt beverages, includes wine and wine coolers, liquor, juice, bottled non-carbonated water and ready-to-drink teas. Table I presents an overview of the beverage container deposit systems in the United States.

California, under Assembly Bill 2020, has created a unique beverage container redemption system. California requires the beverage industry to pay the state a redemption value of 2.5 cents for each beverage container sold. In addition, manufacturers must pay California the balance between what it costs to recycle the container and the scrap value of the container. Consumers redeem containers at privately owned "convenience centers." These convenience centers are privately operated with the State subsidizing their operations by guaranteeing a minimum redemption value for the beverage containers they collect.

New York State's container deposit law took effect on July 1, 1983. The "New York State Returnable Container Act" requires at least a five cent deposit on carbonated soft drinks, beer and malt beverages, mineral and soda water, and wine coolers sold in glass, metal and/or plastic containers of up to one gallon. Both refillable and nonrefillable containers must carry a deposit.

An expanded Bottle Bill would have implications for DOS compliance with the tonnage requirements of Local Law 19 of 1989. Specifically, diversion of additional containers to private sector collection would reduce DOS-collected recycling tonnage, undermining compliance with the recycling tonnage requirements of local law.

Table I Beverage Container Deposit Systems in the United States

State/city (Population)	Date Implemented	Containers Covered/ Exemptions	Amount of Deposit	Handling Fee	Reclamation Center	Unclaimed Deposits	Redemption Rate
California (29,760,021)	9/87	Beer/Soft Drink Wine Coolers Mineral Water	2.5 cents<24 ounces 5 cents>24 ounces	Per container processing fee	State certified redemption centers	Used for administration of the program and grants to non-profits	Aluminum 88% Glass 76% PET 50% Overall 84%
Connecticut 3,287,116	1/80	Beer/Malt/Soft Drinks Mineral Water	Minimum 5 cents	Beer 1.5 cents Soft Drink 2 cents	Retail stores & redemption centers	Retained by Distributor/Bottler	Cans 88% Bottles 94% Plastic 70-90%
Delaware (666,168)	6/82	Nonaluminum/Beer/ Malt/Soft Drink/ Mineral Water<2qt.*	5 cents	20% of Deposit	Retail stores & redemption centers	Retained by Distributor/Bottler	N/A
Iowa (2,776,755)	7/79	Beer/Soft Drink Wine/Liquor	5 cents	1 cent	Retail stores & redemption centers	Retained by Distributor/Bottler	Aluminum 95% Glass 85% Plastic 70-90%
Maine (1,227,928)	1/78 (1090) bottle bill was expanded	Beer/Soft Drink Wine/Wine Cooler Liquor/Juice Water and Tea	Beer/Soft Drink & Juice 5 cents Wine/Liquor 15 cents	3 cents	Retail stores & redemption centers	State received 50% prior to 1996. After 1996 it is Retained by Distributor/ Bottler	Beer/Soft Drink 92% Distilled Spirits 80% Wine 80% Juices/Other . NonCarbonated 75%
Massachusetts (6,016,425)	1/83	Beer/Soft Drink Carbonated Water	5 cents	2.25 cents	Retail stores & redemption centers	Property of Govt. since 1990	Overall 85%
Michigan (9,295,297)	1/83	Beer/Soft Drink Canned Cocktails Carbonated and Mineral Water	Refill 5 cents Non-refill 10 cents	25% of unclaimed deposits	Retail stores	75% for environmental programs, 25% for a handling fee	Overall 93%
New York (17,990,455)	7/83	Beer/Soft Drink Wine Coolers/ Carbonated Mineral Water/Soda Water	5 cents	1.5 cents	Retail stores & redemption centers	Retained by Distributor/ Bottler	Overall 77.8% Soft Drink 72.4% Beer 82.3% Wine Coolers 49.2%
Oregon (2,842,321)	10/72	Beer/Malt/Soft Drink Carbonated Mineral Water	Standard refill 3 cents Non-refill and Non-standard refill 5 cents	None	Retail stores	Retained by Distributor/ Bottler	Overall 85%
Vermont (562,758)	7/73	Soft Drink/Beer Malt/Mineral Water Liquor	Soft Drink/Beer 5 cents Liquor 15 cents	3 cents	Certified redemption centers, retail stores	Retained by Distributor/ Bottler	Overall 85%
Columbia, MO	1/82	Beer/Soft Drink/Malt Carbonated Mineral Water	5 cents	None	Retail stores	Retained by Distributor/ Bottler	Overall 85-95%

* Aluminum cans exempted as long as they maintain 60% return rate.

SOURCES: *Beverage World*, March, April and May 1996
Personnel communication; NSDA, 8/1/96, *Beverage World* Staff 7/30/96
BEVERAGE CONTAINER DEPOSIT AND REDEMPTION STATISTICS: October 1, 1994 - September 30, 1995, New York State Department of Environmental Conservation, March 15, 1996.
Personal communication, Victor Bell, with Pat Franklin, Container Recycling Institute.

Materials Generated and Recovered

Generation Rates

The U.S. Environmental Protection Agency reported that beverage containers (including beer, soft drinks, wine and liquor) represented 4.5% of the U.S. waste stream, by weight, in 1994.[1] The containers specifically targeted by traditional (beer and carbonated beverages) bottle bills represented 3.5 percent of the national waste stream.[2]

[1] *Characterization of Municipal Solid Waste in the United States: 1995 Updated*, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, EPA 530-R-96-001, March 1996.

[2] *Ibid.*

The Can Manufacturer's Institute reports that 64.5 billion aluminum cans containing soft drinks and about 61 billion aluminum beer cans were distributed in the U.S. in 1995. During the same year, the sales of beverages in steel containers fell to almost zero. According to the National Soft Drink Association (NSDA), 310 million refillable glass, 2.2 billion one-way glass and 16 billion PET soft drink bottles were distributed in 1995. The Beer Institute reports distribution of four billion refillable and 21 billion one-way glass beer containers.[3]

Based on national and regional distribution and sales data, SAIC has estimated the quantity and determined the weight of bottle bill containers that entered New York City in 1995. This information is presented in Table II. In developing this table, SAIC assumed an average population for New York City of 8.5 million persons. This represents an average of the estimated working population and the residential population. SAIC weighed typical containers for purposes of this analysis and compared those measurements with data provided by NSDA and the staff of *Beverage World* magazine.

Table II also provides beverage container deposit and redemption statistics from the New York State Department of Environmental Conservation (DEC). Extrapolating from national and regional sales figures indicates that a significant discrepancy exists between the estimated number of bottle bill containers distributed in NYC, compared to the data reported by the New York State DEC. From national and regional sales figures, SAIC estimates that approximately 5.78 billion bottle bill containers were distributed in New York City in 1995. The DEC reports only 1.4 billion bottle bill containers for the reporting period October 1, 1994, to September 30, 1995, on which a deposit was paid.[4] This discrepancy may be attributed to underreporting by distributor and to purchases by vendors and NY State residents of containers from border states. The New York State DEC reports that "the extent of under reporting, although suspected, is unknown. Additionally, the data are unaudited and no independent verification of data is currently available to the DEC."[5]

In recent years, there has been a significant increase in the variety and quantity of "new age" beverage products. This market segment, including ready-to-drink tea, sport drinks, single-serve fruit beverages and bottled non-carbonated water, has grown more than 150% from 1993 to 1995 and is expected to grow an additional 200% by the year 2000.[6] These products are packaged predominately in glass (42%) and PET (33%), with 15% packaged in paperboard or aseptic and 10% packaged in cans (aluminum and steel). *Beverage World* estimated that, in 1995, more than 20 billion "new age" beverage containers were generated in the U.S. Based on per capita consumption figures, 700 million "new age" beverage containers were distributed in New York City. At the projected 200% growth rate, these containers will equal the weight of traditional bottle bill containers by the year 2000. These "new age" beverage containers are not included in New York State's Returnable Beverage Container Act, or by any other container deposit state, except Maine.

[3] CAN DATA- Can Manufacturers Institute, Aluminum Association, Institute of Scrap Recycling, Steel Recycling Institute; GLASS DATA- Glass Packaging Institute; PET DATA- American Plastics Council, Container Consulting, Inc.

[4] *BEVERAGE CONTAINER DEPOSIT AND REDEMPTION STATISTICS: October 1,1994 - September 30, 1995,* New York State Department of Environmental Conservation, March 15, 1996.

[5] *Ibid.*

[6] *Beverage World,* March 1996.

Maine's expanded container deposit program applies deposits to containers for wine and spirits in addition to beverages traditionally targeted by bottle bills, plus "new age" beverage containers. More than 3.2 billion wine bottles and 2.1 billion spirit/liquor bottles were generated in the U.S. in 1995.[7] This figure translates into 94.4 million wine and 60 million spirit/liquor bottles distributed in New York City. Given that such containers are made primarily of glass, SAIC estimates their weight of approximately 77,000 tons.

Recovery Rates

Beverage distribution figures are available primarily on a regional or national level. State by state distribution figures for beer and major soft drinks are considered proprietary by the manufacturers, making efforts to track the sale and distribution of beverage containers on a state-by-state basis virtually impossible. USEPA estimated that the 1994 national recovery rates for beer and soft drink containers were about 31.4% of glass, 65.5% of aluminum and 50% of PET, based on total recycling of three million tons of containers.[8] NSDA counters that 57.4% of all soft drink containers were recycled in 1995, up from 52.4% in 1990. According to *Plastics Recycling Update* and the NSDA, in 1995, the recycling rate for soft drink containers fell from 60.6% to 57.4% nationwide; the PET soft drink recycling rate fell from 44.9% to 40.9% in the same time span.[9]

[7] *Beverage World*, April 1996.

[8] USEPA, op. cit., March 1996.

[9] *Plastics Recycling Update*, June 1996, vol 9, No 6, p. 1.

Table II Containers Distributed - 1994-1995

Container type (weight)	Units Distributed 1995 in NYC (8.5 pop)	Weight Generated in NYC (tons)	Number of containers on which a deposit was charged in NYC (10/1/94 – 9/30/95)	Number of containers redeemed by NYC Bottle Bill (10/1/94 – 9/30/95)	Tons recycled by NYC curbside program (7/1/94 – 6/30/95)
Aluminum soft drink cans (0.67 oz)	2.21 Billion	46,000	Note NYS statistics are by beverage type only not by container type. See Total Bottle Bill Material for data by beverage type	Note NYS statistics are by beverage type only not by container type. See Total Bottle Bill Material for data by beverage type	282 (½ of total A1 collected by NYC program)(13.5 million units) Note: NYC statistics are by container type only
Aluminum beer cans (0.67 oz)	2.09 Billion	43,500	See: Total Bottle Bill Material	See: Total Bottle Bill Material	282 (½ of total A1 collected by NYC program)(13.5 million units)
Steel cans (1.1 oz)	0 million	0	See: Total Bottle Bill Material	See: Total Bottle Bill Material	N/A NYC reports only by material type
Glass soft drink, refillable (10 oz)	10.6 million	3,300	See: Total Bottle Bill Material	See: Total Bottle Bill Material	N/A NYC reports only by material type
Glass soft drink (8.5 oz)	75 million	20,000	See: Total Bottle Bill Material	See: Total Bottle Bill Material	N/A NYC reports only by material type
Glass beer, refillable (10 oz)	137 million	43,000	See: Total Bottle Bill Material	See: Total Bottle Bill Material	N/A NYC reports only by material type
Glass beer (9.5 oz)	720 million	214,000	See: Total Bottle Bill Material	See: Total Bottle Bill Material	89,000 (total glass collected by NYC program)
PET soft drink (2.5 oz avg)	549 million	43,000	See: Total Bottle Bill Material	See: Total Bottle Bill Material	3,280 (41,984,000 units)
Aluminum nondeposit "new age drinks" (1.0 oz avg)	32 million	823	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
Glass non deposit "new age" drinks 9.0 oz avg)	276 million	77,500	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
PET non deposit "new age" drinks (2.5 oz avg)	93 million	4,044	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
PET Bottled Water (1.0 oz)	130 million	4,483	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
Paperboard/Aseptic (.53 oz avg)	101 million	1,670	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
Steel (4 oz avg)	32 million	3,969	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
Wine (16 oz avg)	94 million	47,190	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
Spirits/Liquor (17 oz avg)	60 million	30,030	N/A NYS reports by beverage type only	N/A NYS reports by beverage type only	N/A NYC reports only by material type
Total Bottle Bill Material	5.79 Billion	412,000	898,479,360 beer (+) 529,024,140 soda (+) 9,135,320 winecoolers (=) 1,436,629,820 total units	687,427,260 beer (+) 305,168,720 soda (+) 4,822,080 winecoolers (=) 997,418,060 total units	N/A NYC reports only by material type
Total Expanded Bottle Bill Material	818 million	169,709	0	0	N/A NYC reports only by material type
Total	6.60 Billion	582,000	1,436,629,820	997,418,060	92,844 tons

Sources: CAN DATA- Can Manufacturers Institute, Aluminum Association, Institute of Scrap Recycling, Steel Recycling Institute;
GLASS DATA- Glass Packaging Institute;
PET DATA- American Plastics Council, Container Consulting, Inc.
Beverage World, March, April and May 1996
Personnel communication; NSDA, 8/1/96, *Beverage World* Staff 7/30/96
BEVERAGE CONTAINER DEPOSIT AND REDEMPTION STATISTICS: October 1, 1994 - September 30, 1995.
New York State Department of Environmental Conservation, March 15, 1996.
Personal communication, Victor Bell, with Pat Franklin, Container Recycling Institute, 1/23/97.

Deposit State Recovery Rates

Nationwide, bottle bill states consistently achieve higher collection and recycling rates for beverage containers than programs in non-deposit states. The economic incentive provided by the deposit charged in bottle bill states increases consumer return of containers. The National Environmental Law Center and the Container Recycling Institute report that more than 80% of beverage containers in bottle bill states were recycled, compared to just under 40% in non-bottle bill states. All of the deposit states have achieved beverage container recovery rates well above 70%. The New York State DEC reported an overall redemption rate of 77.8% from October 1, 1994, through September 30, 1995.[10] This estimate is based on an 82.3% recovery rate for beer containers, 72.4% recovery for soda containers and 49.2% for wine coolers. In New York City, DEC reports a 76% redemption rate for beer containers, 57% for soda containers, 52.8% for wine coolers and an overall redemption rate of 69.4%. These rates are lower than the recovery rates reported by other container deposit states. Michigan, which has a 10 cent deposit on one-way containers, has an overall redemption rate of 94%.

The U.S. General Accounting Office (GAO) reports that, while the population of bottle bill states account for less than one third (30%) of the population of the U.S., these states recycled nearly two-thirds of all glass and 98% of all PET plastic recycled nationwide in 1990.[11] However, NAPCOR (National Association for Plastic Container Recovery) disputes the PET recycling rate, estimating that virtually all of the growth in PET recycling over the last five years has come from recycling in non-bottle bill states. The post-consumer recycling rate for PET bottles increased from 28% to 41% from 1989 to 1995.

According to the 1990 GAO report, return rates for beverage containers varied from 72% to 98% in the seven deposit states for which information was available. In NSDA's 1991 study, *Impact of Container Deposits on Curbside Recycling: Two Case Studies*, Gershman, Brickner & Bratton found that, of the beverage containers sold in the town of Islip, New York, 64.3% were redeemed for the deposit, 12.7% were recovered through curbside recycling and 23% were not recovered.[12]

New York City collects beverage bottles and cans in its curbside recycling program. The NYC Department of Sanitation (DOS) reports that 3,300 tons of PET, 560 tons of aluminum and 90,000 tons of glass were collected at curbside in FY 1995.[13] DOS staff have not determined what percentage of these materials were beverage containers. However, DOS and SAIC estimate that more than 95% of the DOS collected aluminum consisted of cans that were subject to deposit. A significant number of non-deposit PET and glass beverage containers are sold, complicating estimates of the percentage of deposit bottles collected at curbside. However, based on historic sales data,[14] SAIC estimates that 20% of the glass collected at the curb is deposit containers, 40% is food containers and 40% is wine, liquor and "new age" product containers.

[10] NYSDEC, *op. cit.*, p. 8.

[11] U.S. General Accounting Office, *Trade Offs Involved in Beverage Container Deposit Legislation* GAO/RCED-91-25, November, 1990.

[12] Gershman, Brickner & Bratton, Inc.,32
Impact of Container Deposits on Curbside Recycling: Two Case Studies.
Prepared for National Soft Drink Assoc. Solid Waste Programs Division. July 1991.

[13] Personal communication, Eric Zimiles, DOS 8/1/96.

[14] *BEVERAGE CONTAINER DEPOSIT AND REDEMPTION STATISTICS: October 1,1994 - September 30, 1995*, New York State Department of Environmental Conservation, March 15, 1996.

Non-deposit state recovery rates

As stated above, states that do not have container deposit legislation generally recover a lower percentage of beverage containers compared to deposit states. The following discussions describe the success of container recovery programs in three selected non-deposit states, Florida, New Jersey and Rhode Island, and the city of Seattle. These programs were selected to illustrate successful programs operating without deposit legislation.

In a report entitled *The 30 Most Populous Counties in Florida, Solid Waste Management* (February, 1993), the Florida Department of Environmental Regulation reported that between July 1, 1991, and June 30, 1992, 90% of Florida's population recycled 27% of 19.14 million tons of solid waste generated through a combination of curbside collection and drop-off programs. The thirty counties, producing 94% of the state's total municipal solid waste, recycled 38% of the aluminum cans generated, 18% of the glass and 11% of the more than 200,000 tons of plastic bottles.[15]

New Jersey's mandatory recycling program requires source separation of all aluminum, glass containers and HDPE milk jugs as well as PET soda bottles. Thus, the New Jersey Department of Environmental Protection recycling rate figures of 68% of glass containers and 69% of aluminum cans applies to a much larger universe of potentially recyclable containers than would be collected by a deposit program.[16]

According to available municipal waste data from the *Rhode Island Solid Waste Management Corporation MRF Performance Report,* the Rhode Island mandatory recycling program diverted 37% of glass containers, 40% of PET soda bottles and 25% of aluminum containers generated in the State. Again, this program targets a broad variety of containers, in addition to beverage containers. Additional quantities of aluminum beverage containers are captured through drop-off and buy back centers.[17]

The City of Seattle maintains an extensive curbside collection program. In 1991, Seattle's recycling program including curbside collection, drop-off and buy-back 64.4% of all glass containers, 63.5% of all aluminum cans and 40.5% of PET soda bottles. The figures for curbside collection of beverage containers, only, were 49% for glass and 26% for aluminum.[18]

Cost to State and Industry

State Government Costs

Little data is available to estimate administrative costs associated with container deposit legislation for governments of traditional bottle bill states because, in most cases, the systems do not require

[15] Florida Department of Environmental Regulation, Bureau of Solid and Hazardous Waste. *The 30 Most Populous Counties in Florida: Solid Waste Management.* February 9, 1993.

[16] McCarthy, James E. *CRS Report for Congress,* "Bottle Bills and Curbside Recycling: Are They Compatible?" January 27, 1993, p. 22.

[17] *Ibid* p. 23.

[18] *Ibid* p. 24.

government intervention or monitoring. Thus, traditional container deposit systems require little additional state staff. The burden of administering the program falls on industry. In New York State, administrative costs associated with the deposit legislation are minimal, as no full-time employees are assigned to the program. The Department of Environmental Conservation collects data from the beverage industry and publishes both a monthly summary and a year-end report. According to the Department's staff[19] less then a half-time equivalent is required to administer the program. Presently, New York maintains only limited enforcement of the New York State deposit program. The Moreland report recognized the need for additional enforcement but legislation to improve enforcement has not passed to date and no estimates are available as to the costs involved.

In California, however, redemption fees (about $350 million annually) are paid directly to the State. Unclaimed deposits are retained to pay for grants to cities and towns, to support recycling programs and to fund the Conservation Corps. Manufacturers must pay the State of California the balance between what it costs to recycle a container and the scrap value of that container. Administration of the California container redemption program requires between 150 and 200 state employees and a budget of $25 million.

In addition, California "convenience centers" submit their overhead costs plus a percentage profit to the State for reimbursement. In 1990, California's recycling fund paid $13 million in "convenience incentive payments" (CIPs) to low-volume recyclers to insure the long-term operation of the convenient recycling locations. In 1993, CIPs were replaced by a handling fee of 1.7 cents per container; total payments are capped.

Industry Costs

The beverage industry's deposit system cost data are proprietary, and both the beer and soft drink industries have not provided container deposit states with requested and useable data. The Moreland Act Commission's 1990 report on the Returnable Container Act, prepared for the Governor of the State of New York under Executive Order No. 129.1, states that the beverage industry would not "permit an accounting firm to evaluate the data that was supplied."[20]

The National Soft Drink Association hired Temple Barker & Sloan to study the economic impact of a national beverage container law. TBS found that higher prices, lost sales, lost tax revenues, and the creation of a reverse distribution system and its accompanying bureaucracy would cost consumers, retailers, state and local governments and the beverage industry more than $6.2 billion. The TBS study, *Economic Impact of a National Forced Deposit Law* (June 1991), estimated that a national bottle bill would cost the beverage industry $2.94 billion or 3.4 cents for every container sold.

The same study projected that lower beverage sales, as a result of price increases, would reduce Federal excise tax receipts by $119 million and state sales and excise tax receipts by $137 million.

[19] Personal communication, Bud Colden, DEC, 8/15/96.

[20] *Moreland Act Commission on the Returnable Container Act Report*, March 15, 1990.

Unclaimed Deposits

A major issue for the current bottle bill states is whether the states should keep the millions of dollars generated by unclaimed deposits. Two states (Massachusetts and Michigan) have passed "escheat laws" requiring beverage distributors to return a portion or all of the unclaimed deposits to the state. In 1995, Maine passed legislation returning the unclaimed deposits to the beverage distributors in 1996. Under these laws, distributors are required to provide data concerning sales and return rates. These data serve as the basis for calculating the amount of money to be returned.

In Massachusetts, the Supreme Judicial Court ruled that unredeemed deposits would be placed into the State's Clean Environment Fund, which funds recycling programs. The law is in its second year and could provide revenue of up to $21 million per year, once fully implemented.

According to the New York State DEC,[21] about $62 million a year in unclaimed deposits are realized in New York State, with $22 million coming from New York City. If the State of New York passed an expanded Returnable Beverage Container Act, and by applying DEC's 77.6% redemption rate, it is estimated that New York State would generate an additional $7 million (assuming the same ratio of reported collections to projected collections — a 12% increase in units generated times $62 million collected).

However, if SAIC's estimate of NYC beverage sales, based on an extrapolation of national and regional sale figures, were applied to the DEC redemption rate, an estimated $204 million in unclaimed deposits would be returned to distributors with the present bottle bill. An additional $29 million would be generated if the bill was expanded to include containers for wine, liquor, "new age" beverages and bottled water.

Number of Jobs Created

Six states reported or projected net gains in employment related to a beverage container deposit system. Jobs created included collection, handling, and processing of containers and the administration of the deposit system. In Connecticut, 1,365 retail (handling) jobs, 60 warehouse jobs, 170 processing and administration jobs and 813 collection jobs were initiated for a total of 2,408 new jobs.[22]

In a Container Recycling Institute report from March 1993 entitled *Beverage Container Deposit Systems in the 90s, Vol. II*, other states reported the following increases in jobs related to the deposit-return legislation: Massachusetts, 1,800 (projected); Michigan, 4,684 (net); New York, 3,800 new jobs; Oregon, 365 (net); and Vermont, 350-450 (net). A University of Maine study, funded by the National Food Processors Association, found that the beverage container deposit law in Maine was responsible for creating 762 retail container handling jobs, 30 warehouse

[21] New York State Department of Environmental Conservation. *BEVERAGE CONTAINER DEPOSIT AND REDEMPTION STATISTICS: October 1, 1994 - September 30, 1995,* March 15, 1996.

[22] Container Recycling Institute. *Beverage Container Deposit Systems in the 90's.* Volume II. March 1993.

positions, 85 FTEs in processing and administration and 480 positions for container collection, for a total of 1,257 new jobs.[23]

Curbside Collection Compared to Bottle Bill and Combined System

Introduction

Bottle bills and curbside collection are two methods utilized to collect recyclable containers. However, these programs are not designed to serve exactly the same purposes. Container deposits target beverage containers only, and were originally intended to reduce litter. They produce a clean, high-quality material. In addition the deposit-return system reaches sectors not traditionally addressed by curbside collection, such as the commercial sector.

Curbside collection programs target a much wider range of recyclable materials and provide a service to households. With curbside collection, the individual consumer does not have to take the containers back to a store or redemption center. Forty-three percent of the population in deposit states also has access to curbside collection, so the two systems are not necessarily mutually exclusive.[24] In New York City, 100% of the population is both served by curbside collection and subjected to the deposit system.

Cost and Efficiency

Some reports indicate that collection and sorting of containers for recycling through bottle bill systems cost more than collection and sorting of containers collected at curbside. According to the TBS study funded by the National Soft Drink Association, the proposed national bottle bill would cost $629 per ton of recycled material as compared to $87 per ton for curbside collection without container deposits.[25] In New York City, curbside collection cost $241 per ton in FY 1994 for all material (including paper) with the collection of mixed metals, glass, and plastic costing $295 per ton.[26]

However, the costs of bottle bills are incorporated into product prices and thus are paid by beverage consumers and the beverage industry, therefore following the polluter pays doctrine. Curbside systems, while costing less to operate, depend on taxes paid by all residents and scrap revenues, making the ability to maintain or expand levels of curbside service dependent on politically uncertain local government budgets and markets.

A beverage industry funded study prepared for Michigan Recycling Partnership in 1996 found that the net cost to industry of the Michigan bottle bill was 4.4 cents per container in 1995.[27]

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[23] McCarthy. *op. cit.*, p. 20.

[24] Temple Barker & Sloane, Inc. *Economic Impact of a National Beverage Container Deposit Law.* Prepared for National Soft Drink Assoc. June, 1991.

[25] City of New York, Department of Sanitation, *Comprehensive Solid Waste Management Plan, Final Update and Plan Modification*, February 1996.

[26] Gershman, Brickner & Bratton, Inc. *op. cit.*, pp. 1-2.

[27] Container Recycling Institute. op. cit.

Introduction of a bottle bill may actually decrease net costs of municipal curbside recycling programs. For example, removing high volume, low weight plastic bottles from curbside collection frees truck space for other materials. Removing glass, the largest residue producer, reduces disposal costs, and enhances the rate of return from recycling processing facilities by reducing the amount of glass that must be marketed to low-end uses such as using it in production of asphalt. Glass and PET are generally considered by municipalities to cost more to collect than they generate in revenues for municipal recycling programs.

However, in some cases deposit systems may increase the net costs of municipal curbside recycling programs by diverting potential sources of revenue from curbside programs. A study conducted for the Aluminum Association examined the economic value of aluminum to recycling programs. It found that although aluminum made up just eight tenths of one percent of the consumer waste stream, it contributed more than 50% of the total recycling revenues.

According to the National Soft Drink Association, beverage containers may represent 70% of the scrap value in the curbside bin. Officials in several New York communities have asked for the repeal of the NY deposit law because it is depriving their curbside programs of revenue. Without these revenues, tax dollars must subsidize the cost of collecting and processing recyclables.[28] Since more than 70% of expanded bottle bill material is glass and PET, and less than 5% is aluminum, the removal of these containers from the curbside program should have little impact on net revenues and should reduce operating costs.

Combined system

A combined system of deposits and curbside collection removes more material from the waste stream at a lower per ton cost to state and local government than only a curbside program. Obviously, some households may prefer the convenience of curbside collection to the burden of returning containers to the store. A combined system diverts additional waste, thereby increasing avoided disposal costs resulting in less cost to government. However, the total system is more costly and the costs that industry passes on to the consumer are greater.

Bottle bill proponents advocate internalizing the costs of collection and recycling to industry. According to Diana Gale of the Seattle Solid Waste Utility, the presence of a bottle bill would increase recycling levels of beverage containers and reduce the City government's overall solid waste management costs, even if the City compensated the curbside program for lost revenue. In a letter to R. Gifford Stack of the National Soft Drink Association, Ms. Gale concluded that, for the City of Seattle, the decline in revenue is more than offset by the additional tonnage recovered through the deposit law and cost savings from avoided collection and disposal.

The City of Cincinnati reached a similar conclusion. In its analysis, implementation of a bottle bill in addition to the City's existing curbside program would increase the amount of material recycled by 60%, while the City government's cost would decrease from $94 to $72 per ton recycled. In Islip, New York, however, deposits only increased MSW diversion rates by 1.6% (by weight).[29]

[28] McCarthy, *op. cit.*, p. 32.

[29] *Plastics Recycling Update*, January 1997.

Effect on Quality of Recovered Materials

Because bottles and cans are sorted and handled individually when returned to retailers, the materials collected by deposit systems are of a higher quality than curbside materials, particularly if the latter are commingled during collection. End users of glass and PET rely heavily on the cleaner materials generated by bottle bill states. Container deposit programs increase the market value of the recovered materials.

In New York, quality is so enhanced by beverage container deposit laws that some buyers have a two-tiered price structure, paying more for empty containers from deposit law systems than from curbside programs. As of January 1997, the curbside PET market price was $.04 per pound, delivered, for truckload quantities of baled mixed-color, curbside bottles. For deposit bottles, the market paid a premium of two to three cents per pound.

Effect on Each Commodity

Glass

A large percentage of glass collected at curbside often is not recyclable due to breakage. In Rhode Island, more than 40% (6,000 of 14,000 tons) of glass collected ended up as residue. This residue produced no revenue; in fact, it cost the taxpayers more than $1 million to collect and landfill this material in 1990. A Florida collector reported that 47.5% of the 10,000 tons of glass collected could not be recycled because breakage made color sorting impossible. Both of these programs rely on Material Processing Facilities where glass receives rough handling. A curbside color separation of glass containers would eliminate this problem, but significantly increase the cost of collection.

Container deposits isolate clean, color-sorted beverage container glass for industry use while reducing the residue problem for the curbside program (although at significant cost to the beverage industry). However, New York's present deposit system collects only beer, soda, and wine cooler container glass. Much of the glass generated by curbside collection programs is derived from products other than beverages, *i.e.*, spaghetti sauce, pickles, etc. These containers would continue to impact curbside collection and disposal.

An expanded deposit program would increase the amount of high-quality glass available to industry. New York City collected 89,000 tons of glass through its curbside program in FY 1995. Virtually all of this glass was used in aggregate for construction (*e.g.*, mixed with asphalt to create "glassphalt;" use by the City's Department of Transportation to pave City streets was the primary market). The City received no revenue for glass used in aggregate for construction.

An expanded NYS Returnable Beverage Container Act could access an additional 77,500 tons of glass bottles in New York City, much of which would be diverted from collection by DOS through the deposit system. Assuming a 69.4% redemption rate, more than 53,500 tons of high-quality glass could be made available to industry for high value end uses (*e.g.*, to make new glass bottles) rather than further glutting the market for low value end-uses such as glassphalt.

The Glass Packaging Institute opposes container deposit legislation because it believes that if retailers are required to handle container returns, the retailer will stock fewer glass bottles to avoid problems with weight and breakage.

Aluminum

The historically high market value of aluminum has created a natural economic incentive for its collection. The aluminum industry established an efficient collection and processing system that has allowed aluminum cans to achieve a high recycling rate (more than 60%). Delaware has exempted aluminum from its deposit law as long as it continues to achieve this high recycling rate.

A deposit return system removes the scrap value of aluminum cans from the curbside programs, which could potentially undermine the economic stability of these programs. Opponents of the bottle bill state that removing aluminum cans from curbside recycling has the potential to reduce revenues by 50% or more.

New York City collected more than 560 tons or 26.8 million aluminum cans through its curbside program in 1995. With an estimated five billion cans in the New York City waste stream, the City's curbside program collects less that 1% of the available aluminum cans. Removal of the deposit program could greatly increase the aluminum collected by the curbside program and would improve the revenues generated by the curbside collection program. However, since less than 5% of the containers that would be targeted by an expanded Returnable Beverage Container Act are aluminum and the present curbside program collects less than 1% of the available cans, expanding the container deposit program would have little impact on the revenue currently collected by the curbside program. Removing the deposit from existing aluminum beverage containers with deposits would increase the revenue generated by the curbside collection program, but would remove much of the incentive for commercial collection of the aluminum cans. Since, at least 50% of the aluminum cans generated in New York City end up in the commercial waste stream, removing the deposit would be expected to reduce the overall recycling rate for cans and increase the litter on New York City streets.

PET and other plastics

PET bottles represent the fastest growing segment of the container industry. PET bottles, in the past, represented the second most valuable commodity typically collected in curbside recycling programs. Today, PET bottles recycling value have fallen to between zero and $0.04 per pound[30] with bottle bill material getting a premium of two to three cents per pound. PET soda bottles are a high volume, low weight material that increases the cost of curbside collection.

An expanded container deposit program could divert significant quantities of this material, freeing space in recycling collection vehicles for other materials. Also, the hand sorting that occurs in a deposit system removes potential contaminants, such as PVC bottles, from the PET stream. A number of "new age" products are sold in HDPE or polypropylene bottles which

[30] National Soft Drink Association. *Forced Deposit Laws: There Are No Winners.* 1989.

have a higher value than PET and require separation. An Expanded Bottle Bill would remove a large percentage of these bottles from the curbside program.

Steel/Tinned Steel

As with glass, many of the consumer products sold in steel cans are not beverages and a bottle bill targeting beverage containers would capture only a small percentage of steel cans. Currently, through a combination of magnetic separation at resource recovery facilities, drop-off and multi-material buy back programs and curbside collection, the national recycling rate for steel food containers was 43.9% and for steel beverage cans, 50.4%. Paint and aerosol cans were recycled at a rate of 15%.

Increase in Product Cost

In *Forced Deposit Laws, There are No Winners,*[31] retail surveys conducted by the soft drink industry between 1979 and 1983 concluded that retail beer and soft drink prices increased following enactment of deposits in New York, Massachusetts, Connecticut and Iowa. Six-pack beer price increases ranged from 36 cents in Iowa to 75 cents in Massachusetts. Six-pack soft drink prices increased 21 cents in Iowa and 28 cents in New York.

According to the TBS report, *Economic Impact of a National Beverage Container Deposit Law,*[32] imposition of a national bottle bill would increase beverage prices by an average of 4.1%. In response to this increase, reduced sales would be expected to total $1.3 billion per year.

Maine's Expanded Bottle Bill

The State of Maine has the only expanded container deposit program in the U.S. Maine expanded its deposit law to include wine, wine coolers, liquor, juice, water and ready-to-drink teas on October 1, 1990. Prior to 1990, Maine's container deposit law covered only beer and carbonated beverage containers. Currently, Maine imposes a five cent deposit on beer, soft drink and juice containers and a 15 cent deposit on wine and liquor containers. A three cent handling fee per container is paid to retailers by distributors. As of 1996, any unclaimed deposits are retained by the distributors. Maine, with a population of 1.2 million, collected an additional 16,000 tons of material through its expanded bottle bill in 1994. The Maine bottle bill has been reviewed by both opponents and supporters of expanded container deposit legislation. Both have used data from Maine to support their positions.

Several important issues related to bottle bill expansion can be discussed in the context of Maine's program. These include: the amount of solid waste addressed, the impact on consumers, and the distribution system.

Opponents of expanded bottle bills argue that the Maine program only addresses about one percent of the total municipal solid waste stream. Supporters of bottle bill expansion counter

[31] Temple Barker & Sloane, Inc. op. cit.

[32] Judith Thorman, Grocery Manufacturers of America, Testimony Before Maine's Joint Standing Committee on Business and Economic Development in Opposition to LD 1813 an Act to Make Changes in the Beverage Container Deposit Law, February 1996.

that the containers targeted by the expansion are the largest growth area in the container industry. These containers will represent more than two percent of municipal solid waste by the year 2000. Supporters further argue that these containers constitute a significant percentage of litter, statewide.

The Grocery Manufacturers of America (GMA) contends that Maine's expanded bottle bill costs distributors more than eight cents per container or $2.00 per case. GMA asserts that a portion of this cost increase is passed on to consumers.[33] Coca-Cola Foods states that it and other manufactures have reduced the variety of beverage and beverage containers sold in Maine, limiting consumer choice of packaging and product size.[34] For example, Del Monte juices were not sold in Maine in 1994. Coca-Cola Foods' Hi-C and Minute Maid brands were not sold in single-serve containers. Supporters of the expanded bottle bill reply that the reduction in product and packaging choice was a deliberate attempt by industry to undermine the expanded bottle bill. In addition, Maine's ban on aseptic containers (juice boxes), its limited market and its rural population contribute to industry cost and constrain product diversity. Further, supporters note that high industry cost is due in large part to Maine's 104% redemption rate. This redemption rate exceeds 100% as a result of fraudulent redemption of containers, labeled with the Maine deposit emblem, from border states.

Because major brand beer and soft drink distributors have exclusive territories, they pick up all redeemed containers for the brands they sell. Manufacturers of expanded bottle bill products, especially "new age" beverages, rely on common carriers to ship to wholesalers and distributors. These manufacturers have no existing infrastructure for the return of empty containers and must rely on third party collection. Opponents of the expanded bottle bill state that "this system introduces new, overlapping and inefficient operating costs and capital requirements for labor, trucks and processing facilities to redeem, collect and process used containers."[35]

Opponents also argue that expanded bottle bill containers can be collected more cost-effectively through a curbside program. Supporters counter that curbside collection captures only 40% of these containers. Because more than 70% of these containers are glass and PET, collection costs are high and value is low.

II. Feasibility of Implementing an Expanded Bottle Bill in New York

Many states have implemented or introduced bills to expand their existing bottle bills. For example, as discussed above, the State of Maine has had an expanded bottle bill since October 1, 1990. Maine's program includes beer, soft drink, wine, wine cooler, liquor, juice, water and ready-to-drink tea containers.

The State of Oregon's electorate voted on container deposit program expansion in November 1996, with the anti-bottle bill forces outspending the pro-bottle bill forces 10 to 1; the measure failed 60% to 40%. Oregon voters decided not to include non-carbonated drinks, *i.e.*, wine

[33] Robert G. McDaniel, Coca-Cola Foods, Testimony to the Massachusetts Joint Committee on Energy Regarding S 328, H3172: An Expansion of the Mandatory Deposit Law, March 15, 1994.

[34] *Michigan Soft Drink, Reasons to Oppose Bottle-Bill Expansion*, March 1996.

[35] Bottle Bill Update, January 1997, Container Recycling Institute.

coolers, juices, ready-to-drink teas and water in containers less than one liter in the deposit program. In January 1997, Oregon's Governor proposed a 3-cent tax on beverage containers at the wholesale level and a 2- to 3-cent handling fee that would move the redemption of beverage containers from retail stores to privately owned redemption centers.[36] Massachusetts and Vermont will consider expanding their bottle bills during the 1997 legislative session.

On January 28, 1997, a bill that would impose a nationwide 10-cent deposit fee on beer, soft drink and water containers was introduced in the U.S. Senate. Similar container deposit bills have been introduced in previous sessions of Congress but have never passed because of opposition from the beverage industry.

In New York State, the Returnable Container Act has been in effect since 1983. The last major investigation of the program was completed in March 1990 by the Moreland Act Commission in response to Governor Cuomo's Executive Order. The Commission found that the Returnable Beverage Container Act reduced litter by 72% and solid waste by about 5% by weight and 8% by volume. The Commission recommended that the Act be expanded to include wine and liquor containers. However, since the Moreland Act Commission's study was completed, a number of significant changes have occurred. "New Age" beverage consumption has increased dramatically as has "new age" containers in the waste stream. The so-called "new age" beverages are not covered by New York State's Returnable Container Act. In 1995, more than 92,000 tons or 660 million "new age" beverage containers were in the New York City waste stream (see Table II). As previously discussed, these materials are expected to increase by 200% by the year 2000. "New age" beverage containers are primarily glass and PET (more than 70%). These containers provide little additional revenue and increase collection and processing costs for curbside recycling. These containers also increase the litter on New York City streets. Since they are not covered by container deposits, there is no economic incentive for their return.

New York City now has a comprehensive recycling program, including residential recycling for all 7.3 million residents and a mandatory commercial source separation program. This program addresses many of the materials that would be included in expanded Returnable Beverage Container Act legislation. The efficiency of the commercial recycling program is limited by the value of the materials collected; since glass and PET are low value and high volume commodities, the economic incentive is minimal. Expanding the deposit legislation to include these commodities will provide a strong incentive to remove these materials from the waste stream.

Expanding the Returnable Beverage Container Act in New York State will be a difficult process. The beverage industry, grocery store owners, and restaurant and deli operators are all strongly opposed to the measure. They feel the Returnable Beverage Container Act will increase the cost of wine, liquor, and "new age" beverages to NYC consumers, increase the handling costs for NYC retailers who take back deposit materials, increase storage space requirements of NYC retailers who take back deposit materials, increase vermin problems in NYC grocery stores and force more limited consumer choices in container types and product sizes. In Oregon more than $3.3 million was raised to defeat the expanded bottle bill measure. Similar opposition can be anticipated in New York State and New York City.

[36] Northeast Research of Orono, 1989.

Nevertheless, recent polls indicate strong public support for Returnable Beverage Container Act expansion. Recent polls indicate public support for expanded deposit legislation ranged from 71% in Maine[37] to 84% in Massachusetts.[38] Although no recent opinion polls are available for New York State, the Moorland Commission found strong public support for New York State's Returnable Beverage Container Act in 1989. Expanding the Returnable Beverage Container Act is not presently on the Governor's agenda as a legislative priority. Further, the New York State Assembly is not presently considering expanded Returnable Beverage Container Act legislation. On January 8, 1997, two bills — AB 186 and AB 705 — were introduced that would impact the New York State Returnable Beverage Container Act. AB 186 would repeal the Act and AB705 would exempt aluminum beverage containers. In order to pass any expansion to the existing Returnable Beverage Container Act, the concerns of the beverage and grocery industry must be addressed. One strategy might involve moving the redemption of beverage containers from retail stores to privately owned redemption centers. This move would relieve the beverage industry of its responsibility for collecting and processing empty containers, and would allow unclaimed deposits to accrue to the State.

An expanded Bottle Bill would have implications for DOS compliance with the tonnage requirements of Local Law 19 of 1989. Specifically, diversion of additional containers to private sector collection would reduce DOS-collected recycling tonnage, undermining compliance with the recycling tonnage requirements of local law.

III. Impact of Expanded Returnable Beverage Container Act on New York City's Economy and Waste Stream

An expanded Returnable Beverage Container Act which includes wine, liquor, juice, bottled water and ready-to-drink tea would have a major impact on New York City's waste stream and the economics of the City's recycling programs. The expanded Returnable Beverage Container Act also would affect distributors, retailers and consumers of wine, liquor, and "new age" beverages.

In 1995, 818 million expanded Returnable Beverage Container Act containers, weighing 170,000 tons, entered New York City's waste stream. Table III projects the amount of expanded Returnable Beverage Container Act containers that could enter the New York City waste stream by the year 2000. Further, Table III projects the amount of expanded Returnable Beverage Container Act material that would be recycled with and without the expanded Returnable Beverage Container Act. Without the expanded Returnable Beverage Container Act an additional 190,000 tons of material will require landfilling; approximately 50% borne by the City.

Most materials that would be covered under an expanded Returnable Beverage Container Act currently are collected through the residential and commercial recycling programs. An expanded Returnable Beverage Container Act will reduce the amount of material, primarily glass and plastic, now collected by the residential curbside recycling program. An expanded deposit program could reduce curbside glass collection by as much as 30% or 26,700 tons (SAIC assumed that 40% of the existing glass collected at curbside is "new age" and wine and

[37] Mass. Public Interest Research Group, 1996.

[38] Personal communication, Eric Zimiles, 8/8/96.

liquor containers and that 69% of these are diverted to the deposit program). Since the City is now marketing glass as aggregate and receives no revenue from it, processing and collection costs will be reduced. If New York does not expand the container deposit bill, an additional 69,000 tons of material will be collected for recycling by the commercial and residential programs (because of the growth in "new age" beverages by the year 2000). Assuming that 50% will be collected by the City's curbside program, an additional 34,500 tons will be collected at the City's expense. At the 1996 processing cost of about $45 per ton for mixed containers,[39] assuming this cost per ton remains constant to the year 2000, the City will pay an additional $1,552,500 in processing fees in 2000. Further, by 2000, if no expanded deposit law is in place, residential refuse will increase by about 95,000 tons, costing the City about $7,125,000 in additional tip fees (assuming a $75.00 per ton tip fee[40] in the year 2000). With the closing of Fresh Kills, collection, transfer and disposal costs could be much higher.

On the commercial side, the expanded Returnable Beverage Container Act will provide an additional economic incentive for the source separation and recycling of this growing waste stream.

The expanded deposit law would have a major impact on wine, liquor, and "new age" beverage manufacturers, distributors and retailers. Cost to beverage manufacturers and distributors for collecting additional materials has been estimated at between three and eight cents per container. Costs may be higher because distributors of "new age" beverages do not have exclusive territories and would rely on a third party collection systems. A portion of these costs will be passed on to consumers in the form of increased beverage costs. For example, when the New York State Returnable Beverage Container Act first took effect, soft drink prices increased 28 cents per six pack.

Retailers now receive a per container handling fee of two cents (up from 1.5 cents in 1995). They are concerned that they will incur additional costs up to four cents per container under an expanded Returnable Beverage Container Act. The Moreland report estimated that actual handling costs range from 1.95 to 5.97 cents. New York City has a large number of small retailers, *i.e.*, delicatessens, bodegas and street merchants who do not routinely accept container returns. Consumers must return containers purchased from these vendors to supermarkets and beverage redemption centers. Major retailers are concerned about the burdens of over-redemption and providing redemption service to the poor and homeless who can impact customer relations.

Consumers will pay more for wine, liquor and "new age" beverages after the passage of an expanded deposit bill. These products would be put on an equal basis with other beverages, which are already subject to a deposit.

An additional issue that should be addressed is the proposal to increase the deposit from 5 cents to 10 cents. The New York State Returnable Beverage Container Act was passed in 1982. Using the consumer price index, the 1982 nickel is now (1/1997) equivalent to only $0.0312. As mentioned previously, in 1995 the recycling rate for soft drink containers fell from 60.6% to 57.4% nationwide, and the PET soft drink recycling rate fell from 44.9% to 40.9% in the same

[39] *Ibid.*

[40] *Plastics Recycling Update*, June 1996.

time span. *Plastics Recycling Update* stated in June 1996 that "it appears that some beverage container deposit programs are becoming less effective in capturing plastic bottles. A nickel just doesn't command the same respect it once did."[41] Michigan, the only state with a 10 cent container deposit, maintains a 94% collection rate. SAIC estimates that increasing the deposit to 10 cents will raise the capture rate of materials from 69% to 80%. At 10 cents per container the economic incentive at the commercial level should improve collections significantly. With an 80% capture rate an additional 100,000 tons of material could be removed from the New York City waste stream. Table III projects the impact of increasing the deposit to 10 cents per container.

Table III Projected Impact of the Expanded Beverage Container Act on New York City

Container Type	1995 Unit/ Weight	2000 Unit/ Weight	Tons recycled in 1995	Projected tons to be recycled in 2000 without deposit	Projected tons recycled in 2000 with a 5 cents deposit	Projected tons recycled in 2000 with a 10 cents deposit	Additional tons recycled because of the expanded deposit law	Additional tons recycled because of the expanded deposit law plus a 10 cents deposit
Wine	94 million/ 47,000 tons	94 million/ 47,000 tons	12,900	12,900	32,500	37,600	19,500	24,800
Liquor	60 million/ 30,030 tons	60 million/ 30,030 tons	8,200	8,200	20,700	24,000	12,500	15,800
"New Age"	664 million/ 92,489 tons	2,656 million/ 370,000 tons	25,200	101,000	255,300	296,000	154,300	195,000
Beer and Soft drinks (present Returnable Beverage Container Act)	5,790 million/ 412,000 tons	6,950 million/ 495,360	284,800	341,800	341,800	396,300	0	54,500
Total expanded Returnable Beverage Container Act	818 million/ 169,500 tons	2,810 million/ 447,000 tons	46,300	122,100	308,500	357,000	191,300	235,600
Total	6,608 million/ 582,300 tons	9,760 million/ 942,360 tons	331,100	463,900	690,300	753,300	191,300	290,100

Note: Wine and liquor consumption is projected to remain constant through 2000. "New Age" beverages are projected to increase by 200%. Beer and Soft drinks are projected to increase by 20%.

Recycling rate for 1995 and 2000 without deposit was assumed to be 27.3%. Deposit rates for 1995 and 2000 were assumed to be 69% with a 5 cent deposit and 80% with a 10 cent deposit, based on data developed from Michigan's deposit rate compared to New York State and New York City rates.

IV. Summary and Recommendations

As estimated by SAIC the expanded Returnable Beverage Container Act would:

- Remove 190,000 tons of waste per year, primarily glass and PET, from the New York City waste stream by the year 2000.
- Reduce by 95,000 tons per year, by the year 2000, the material requiring collection, transfer and disposal by NYC DOS.
- Reduce New York City waste management costs by more than $8,600,000 a year by the year 2000.
- Reduce litter on NYC streets.

- Reduce by 34,500 tons those low revenue, high volume recyclable materials collected by the NYC curbside program.
- Internalize the costs of collection and recycling of wine, liquor, and "new age" beverage containers into the cost of the product, as they already are for beer and soft drinks.
- Increase by between three and eight cents per unit, the cost of wine, liquor and "new age" beverages to NYC consumers.
- Increase the handling costs for NYC retailers who take back deposit materials.
- Increase the storage space requirements of NYC retailers who take back deposit materials.
- Possibly limit consumer choices in container types and product sizes.
- Remove an additional 100,000 tons of materials from the New York City waste stream by the year 2000 if the deposits were increased from 5 cents to 10 cents.
- If NY State passes an escheat provision requiring beverage distributors to return a portion or all of the unclaimed deposits to the State, this would raise funds that could be dedicated to help counties and municipalities underwrite costs of their solid waste prevention, recycling and waste management programs.

These assertions suggest that the City of New York should fully support the expansion of the deposit law to include wine, liquor and "new age" beverages. The City should also support an overall increase in the deposit to ten cents. SAIC understands that strong opposition to the expansion of container deposits is led by the major food and soft drink companies and trade associations such as the NSDA, Grocery Manufacturers of America and the National Food Processors Association. Further, NYC retailers will strongly oppose expansion of the deposit program.

However, as previously noted, an Expanded Bottle Bill would have implications for DOS compliance with the tonnage requirements of Local Law 19 of 1989. Specifically, diversion of additional containers to private sector collection would reduce DOS-collected recycling tonnage, undermining compliance with the recycling tonnage requirements of local law.

The public has always shown strong support for the Returnable Beverage Container Act. This backing plus support from the environmental community will reinforce any modification to New York State's deposit legislation, but policy makers must address the concerns of the beverage and grocery industries. Moving redemption of beverage containers from retail stores to privately owned redemption centers may resolve some of the opponents' concerns. This move would relieve the beverage industry of its responsibility for collecting and processing empty containers, and would allow unclaimed deposits to accrue to the State.

Removing the deposit from existing Returnable Beverage Container Act aluminum containers would increase the revenue generated by the City's curbside collection program, but would remove much of the incentive for commercial collection of the aluminum cans. Since at least 50% of the aluminum cans generated in New York City end up in the commercial waste stream, removing the deposit would reduce the overall recycling rate for aluminum cans and would increase the litter on New York City streets.

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Manufacturer's Responsibility: Case Studies and Options for the U.S.

I. Introduction

The New York City Department of Sanitation (DOS), Bureau of Waste Prevention, Reuse and Recycling (BWPRR), assigned this study to assist the development of an anticipated roundtable on packaging restrictions. The Roundtable is to be funded by the U.S. Environmental Protection Agency (U.S. EPA), on behalf of DOS, and moderated by the Cornell Waste Management Institute. This study updates prior research, funded by DOS, on the status of Manufacturer's Responsibility packaging regulations that have been pursued or enacted in various countries throughout the world.

This paper presents a discussion of Manufacturer's Responsibility (variously known as extended producer responsibility, environmental packaging legislation, environmental packaging taxes, or eco taxes) as a means of promoting waste reduction, and reallocating waste management costs from local government and taxpayers to the producers and consumers of product packaging. The recommendations made in this paper are presented essentially in the context of an alternative to the United States enacting full and comprehensive packaging legislation, similar to legislation in Europe and Asia, which places on industry the primary financial responsibility to underwrite the costs of managing packaging waste.

Passage of Manufacturer's Responsibility legislation would result in large-scale restructuring of the U.S. waste management system. Congressional leaders in the U.S. have discussed, but have not strongly embraced, a Manufacturer's Responsibility approach in draft legislation that would reauthorize and amend the Federal Resource Conservation and Recovery Act (RCRA) — the nation's primary solid waste law. Therefore, rather than focusing this study on the merits of instituting Manufacturer's Responsibility legislation in the United States, the focus is on how the U.S. might capitalize on international legislation through non-legislative initiatives. The report first provides context and a discussion of the status of a cross-section of legislative programs enacted in Europe and Asia. Conclusions and options for the United States are drawn from an examination of these programs, and the opportunities they present for U.S. government policy makers, environmental advocacy organizations, and industry leaders, to influence domestic packaging waste generation and recycling. The conclusions and options presented in an earlier draft of this study served as discussion topics at a U.S. EPA-funded roundtable in November 1998.

The first section of this paper provides a brief overview of the history of environmental packaging programs. The second section provides brief case studies of programs implemented in Belgium, Germany, Taiwan and the United Kingdom. The final section provides an analysis of how these programs can be adapted and used to promote waste prevention and recycling in the U.S.

II. Background

In the U.S. and abroad, public concern has been growing for decades about the environmental and financial impacts associated with the management of packaging materials from consumer products. In the U.S., we have responded to this concern in the form of regulation, such as beverage container deposit legislation ("bottle bills"), and various non-regulatory options, such as the use of recycling emblems and labeling regarding recycled content.[1] However, the primary impetus for legislation to reduce packaging waste or manage it in an environmentally preferable manner, such as recycling, has really come from Europe and, more recently, Asia.

The initial environmental packaging program was implemented by Germany, in 1991, with the formation of the Duales System, or Green Dot, program. The German program was developed in response to several factors, including the lack of available landfill space, citizen resistance to construction of new incinerator capacity and bans on landfilling most recyclable materials. Germany's ability to implement such a revolutionary program also was aided by the electoral success of the German Green Party. Germany experienced many problems during the initial few years of implementation of the program. Nevertheless Germany has served as a model for many other countries who now are implementing similar programs, and served as a model for a European Union directive. Some of the problems experienced by Germany in the start-up phases are discussed in more detail in Section II.

In December 1994, partially in response to Germany's lead, the European Union adopted the EU Directive on Packaging and Packaging Waste. The essential goal of the Directive was to harmonize national measures concerning the management of packaging and packaging waste, to prevent or reduce the environmental impact of packaging and packaging waste and to provide a high level of environmental protection both within member states, as well as in other countries.[2]

The Directive set specific five-year goals that member countries were expected to meet. These include:

- For recovery, a minimum of 50 percent up to a maximum of 65 percent, by weight. Recovery includes recycling, composting, biodegradation and incineration with energy recovery.
- For recycling, a minimum of 25 percent up to a maximum of 45 percent by weight of all packaging materials. At least 15 percent of any one packaging type must be recycled.[3]

New ten-year goals will be established sometime in 1999.

[1] If manufacturers label packaging as recyclable or containing recycled content, some regulations will apply related to the claims that they make; however, U.S. manufacturers are not required to label packaging as recyclable or as containing recycled content.

[2] As is pointed out by *Europen*, the European packaging organization, the Directive also is designed to ensure the functioning of the internal market and to avoid obstacles to trade and distortion and restriction of competition within the European Community.

[3] Thompson Publishing Group. "International Regulations." *Environmental Packaging*, October 1997.

EU member states were to have translated these goals into national law by July 1996. Responsive national legislation should include specification of mechanisms to achieve the goals. As of May 1998, only about half of the EU countries had fully implemented programs. Many of the countries are still in the process of finalizing their programs. However, most EU countries now have implemented some form of packaging legislation that requires recovery and recycling of certain percentages of the packaging waste stream. Exhibit 1 shows EU countries, as of May 1998, that have finalized regulations, have pending draft regulations and that have yet to draft any significant legislation. Finalizing regulations, however, is not the same as fully implementing a program. Most EU countries now have final regulations, if not fully implemented programs.

Exhibit 1: Status of EU Country Legislation (as of May 1998)

Legislation in Effect	Draft Legislation
• Austria	• Finland
• Belgium	• Hungary
• Czech Republic	• Ireland**
• Denmark	• Poland
• France	• Slovakia
• Germany	• Turkey
• Italy	
• Netherlands	
• Norway*	**No Legislation**
• Portugal	
• Spain	• Greece
• Sweden	• Luxembourg***
• Switzerland*	
• United Kingdom	

* Not official EU Members.
** Ireland has a program in place, but it is not yet consistent with the Packaging Directive.
*** Luxembourg has an operating voluntary program in place.

To meet the established goals, most of the countries allow for the creation of what is known as a Third Party Organization. Third Party Organizations are generally industry-sponsored corporations that take responsibility for meeting the recovery and recycling requirements of the country. The role of a Third Party Organization is to set and collect fees from manufacturers, or other responsible parties and, with these fees, finance collection systems, as well as to contract with recycling organizations, or to market collected materials, to ensure that materials are recycled.

Although requirements differ significantly by country, in general, packaging generators pay fees to the Third Party Organizations based on the type of material used in the packaging and the quantity of packaging placed on the market or used in shipping and receiving. Quantity may be determined by weight, volume, revenue, or number of sales units. Responsibility is assigned in different countries to different participants in the production and distribution chain, including the manufacturer, packer, wholesaler, importer, or retailer, or may be borne by a combination of these parties, as in the case of some forms of Shared Responsibility. In addition, different countries take different approaches to defining sales and transport packaging and to defining different types of packaging within these two broader categories.

Asia, driven by high population densities and little available landfill space, also has taken an assertive stance toward recycling packaging wastes. To date, Taiwan, Japan and Hong Kong are actively pursuing Manufacturer's Responsibility programs and it appears that The Philippines, South Korea and Indonesia have environmental packaging legislation in place that could be used to establish such programs.

In addition to environmental packaging regulations, many European and Asian countries are now implementing more comprehensive Extended Producer Responsibility requirements. A wide range of consumer products is being addressed, including end-of-life electronics, end-of-

life vehicles and scrap white goods (*e.g.*, washing machines). For example, in April 1998, the European Commission issued a draft proposal for a Directive on Waste from Electrical and Electronic Equipment. In general, this Directive requires that member States:

- encourage producers of electrical and electronic equipment to reduce the use of dangerous substances and preparations;
- ensure that measures are taken to reduce the number of different types of plastic as much as possible;
- promote the design and production of electrical and electronic equipment so as to facilitate its repair, upgrade, re-use, dismantling and recycling; and
- ensure that producers of electrical and electronic equipment use common component and material coding standards.

The remainder of this paper explains in greater detail the general theory behind environmental packaging regulations, referred to generally as Manufacturer's Responsibility; describes how Manufacturer's Responsibility has been implemented in four countries (Belgium, Germany, Taiwan and the United Kingdom); specifies how the lessons learned in these countries might apply to the U.S.; and recommends what steps might be taken to leverage these programs to influence waste reduction in the U.S.

III. Manufacturer's Responsibility

Basic Concepts

Manufacturer's Responsibility programs are based on the economic theory of externalities, (*i.e.*, that costs and benefits are not always realized solely by those generating them). Costs associated with a product throughout its lifetime are either internal and paid directly by the producer (*e.g.*, purchasing raw materials) or external and paid by an outside party (*e.g.*, by municipalities or consumers managing the product as waste once it is discarded). External costs can be either positive or negative. The classic example of a positive externality is when one party improves her/his property, but the enhancement also benefits the neighboring population by, for example, raising surrounding property values. Pollution is the classic example of a negative externality. A factory will benefit directly from discharging its effluent into public sewers, but often the cost of treating that effluent will fall on a much broader segment of society. Manufacturer's Responsibility programs seek to reallocate the negative externalities associated with waste management (*i.e.*, the cost of collection, processing and recycling or disposal) and to internalize these costs in the production process through the application of fees or some other mechanism that supports downstream management of the waste materials. Manufacturer's Responsibility programs thus far have primarily targeted packaging associated with consumer products, but have expanded in concept over recent years to include the products themselves, most notably electronics products.

When negative externalities exist, such as when producers are not required to pay for the ultimate management of the waste resulting from the sale and use of the products they manufacture and/or market, producers have an incentive to generate more products than are

socially optimal. In the case of packaging waste, if the costs of the externality, (*i.e.*, the discarded packaging) can be shifted to the producer (internalized), the producer may 1) adjust the production quantity or production processes (*e.g.*, by lightweighting or streamlining material use) to eliminate or reduce waste to avoid paying the waste management costs formerly borne by the municipality and its taxpayers; 2) pay for the costs of waste management previously borne by the municipality and its taxpayers out of producer profits; and/or 3) pass the costs on to the consumer so that the costs are equitably distributed among those benefitting from the product.

Put simply, the theory states that those people directly responsible for creating waste should pay for at least part of the cost of the management of that waste, (*i.e.*, the "polluter pays" principle). This idea is based on the assumption that taxpayer-funded waste management is inequitable and that only the manufacturer and the consumer of a specific product or package should pay for management of that item. Under a system of Manufacturer's Responsibility, manufacturers are made directly responsible for the cost of managing their wastes. The intent of such a system is to drive the producer to reduce the quantity or change the type of packaging marketed to reduce their costs, or to cause the manufacturer to pass at least a portion of the added cost on to the consumer. In this way, the cost of waste management (*e.g.*, recycling) is linked directly to packaging decisions made by producers and purchasing decisions of consumers, rather than being spread across society at large.

U.S. Initiatives

To date, the U.S. has not adopted any national form of Manufacturer's Responsibility, although some initiatives are in place on a more local or limited basis. For example, states have implemented deposit systems and applied advance disposal fees on certain products; and Federal and state agencies have set guidelines regarding the use of recycling emblems and the use of terms such as 'recyclable.'

In addition to the types of programs mentioned above, many prominent organizations and individuals have actively promoted adopting Manufacturer's Responsibility in the U.S. In 1993, Manufacturer's Responsibility was promoted by the Market Development Subcommittee of the Recycling Advisory Council (RAC), a program of the National Recycling Coalition, as one of the six most promising options to enhance recycling and to reduce the quantity of waste disposed in the U.S. The RAC recommended that the U.S. consider a system of Shared Responsibility, where manufacturers would be responsible for financing the recovery of a specified percentage of the packaging associated with their products. According to the RAC, Shared Responsibility could be accomplished by creating an alternative waste management system, with industry helping to fund municipal collection, or by having industry contract out waste management functions.[4] This concept requires either various industrial sectors (e.g., producers, packers/fillers, wholesalers) or industry and the public sector to share responsibility for waste management, specifically recycling. Under Shared Responsibility, an industry-sponsored Third Party Organization likely would process materials but would leave collection to the public sector. However, the industry organization would pay municipalities for the costs of collecting recyclables, to the

[4] Fishbein, Bette K. *Germany, Garbage, and the Green Dot: Challenging the Throwaway Society.* INFORM, 1994, p. 188; and Recycling Advisory Committee, *Creating Markets for Recycled Materials - Manufacturer's Responsibility and Shared Responsibility,* December 1992 and personal communication with Victor Bell, RAC member, March 1998.

extent that these costs exceed those of regular garbage collection, adjusting for the avoided disposal fees associated with the reduced quantity of garbage disposed.[5]

Prominent solid waste policy experts who follow legislative trends and progress indicate that, since 1993, neither Manufacturer's or Shared Responsibility have been seriously advanced as a policy option to increase recycling and reduce the quantity of materials disposed in the United States.[6] However, as Bette Fishbein of INFORM points out in her book on the subject, *Germany, Garbage, and the Green Dot,* several legislative initiatives have been proposed, and some enacted, in the United States in the 1990's. These include:

- Responsible entity language contained in the 1992 Federal legislation to reauthorize the Resource Conservation and Recovery Act (RCRA). Had this legislation passed, it would have required all brand name manufacturers with annual receipts of $50 million or more to "recover," by themselves or through contracts with others, 50 percent of packaging materials made of glass, paper, metal, or plastic by the year 2000, through source reduction, reuse, or use of recycled content. Senator Max Baucus continues to support this approach.
- "Rates and dates" packaging legislation advanced in ten states proposed mandating that packaging be reusable, recyclable, or made of recycled content. The actual rates specified and the dates for achieving compliance have varied among the states. California, Oregon and Wisconsin have passed such legislation for rigid plastic containers. Similar legislation also was passed in Massachusetts, but was subsequently defeated in a November 1992 referendum. Likewise, legislation of this type has been proposed in New York State, including one proposal known as the Environmentally Sound Packaging Act, but none have been enacted.

Many states have implemented Advance Disposal Fees (ADFs), which in some ways function as a system of Manufacturer's Responsibility, depending on how fees are levied and how the program is implemented. For example, 38 states have passed legislation that requires customers to pay a deposit on lead-acid vehicle batteries at the point of purchase. The deposit serves as a form of ADF in that it helps to ensure that end-of-life batteries are returned to points-of-sale to receive credit for the deposit. Once returned, batteries generally are taken back by the manufacturer, who takes responsibility for ensuring that they are recycled.

In 1993, the Florida State Legislature implemented ADFs broader in scope than any other ADF program in the U.S. The Florida law placed ADFs on all containers defined as any bottle, can, or jar greater than five ounces, but less than one gallon, and sealed by the manufacturer. Fees collected were used to recover recyclable materials and to improve the markets for these materials. Fees were levied at the wholesale level (or point of first importation into the State). The ADF was extremely controversial among both retailers and wholesalers and was not reauthorized when the original law expired in 1995. The Florida program was, however,

[5] Ibid.

[6] SAIC spoke in detail on this issue, in February 1997, with Janet Matthews, Legislative Director of the New York State Legislative Commission on Solid Waste Management; Ed Boisson, Director, Northeast Recycling Council; and Alan Hershkowitz, Senior Policy Analyst, Natural Resources Defense Council.

deemed successful at helping to develop and support markets for many materials, such as PET. After the Florida ADF was allowed to sunset, the value of post-consumer PET dropped substantially. This drop was blamed in part on the discontinuance of the ADF.

Florida also had applied a product waste disposal fee of 10 cents per ton on producers and users of newsprint. The fee was based on the total weight of newsprint actually consumed in publication. A credit of 10 cents per ton was allowed against the fee obligation for every ton of recycled newsprint used in the publication of products. The fee was to be rescinded if the recovered content use in newspapers reached 60 percent by 1999. There was an interim goal of 30 percent for 1996. When this interim goal was met, the Florida State Legislature decided that the industry was sufficiently meeting the intent of the original law and removed all rates and dates from the legislation; hence effectively removing the 10 cent per ton tax and the requirement that industry meet the 60 percent recovered content goal by 1999.

California has passed legislation that is in many ways similar to the Manufacturer's Responsibility programs taking effect in Europe. Most notably, all rigid plastic packaging containers with a capacity of eight fluid ounces to five fluid gallons sold in California must meet at least one of the following four criteria:

- be made of at least 25 percent post-consumer material;
- have a recycling rate of 25 percent for non-PET containers or 55 percent for PET containers;
- be reusable or refillable; or
- be a source reduced container.

Manufacturers are required to file reports with the California Integrated Waste Management Board, when CIWMB requests certification of compliance, specifying post-consumer content, describing recycling activities, and providing information regarding source reduction activities.

A bill pending in the California State Assembly (AB 2555) would strengthen the push toward Manufacturer's Responsibility by requiring, among other things, "each producer of plastic packaging materials to ensure that the following quantities of material sold or offered for sale in California do not become waste," by certain dates. As of May 1998, the proposed dates and targets specify that:

- On and after January 1, 2003, no more than 50% becomes waste;
- On and after January 1, 2006, no more than 35% becomes waste; and
- On and after January 1, 2010, no more than 20% becomes waste.

In addition, the legislation would require that by July 1, 2004, the CIWMB submit a report to the Legislature and Governor which includes the estimated amount of each plastic packaging material type that was generated and that became waste during the previous calendar year, and a list of the largest users of plastic packaging material that have met the requirements of this bill.

At the national level, bills were recently introduced in the House and Senate to require a refund value for certain beverage containers and to provide resources for state pollution prevention and recycling programs. While the emphasis of these bills (HR 1586 and S 215) is on creating a national deposit system, rather than creating a system of Manufacturer's Responsibility, the bills would achieve the goal of assigning management responsibility more directly to the parties responsible for generating the waste. In addition, the rationales for the bills contain many ideas central to the idea of Manufacturer's Responsibility. Among other things, the bills state that:

- The failure to reuse and recycle empty beverage containers represents a significant and unnecessary waste of important national energy and material resources.
- The littering of empty beverage containers constitutes a public nuisance . . . and imposes on public agencies, private businesses, farmers, and landowners unnecessary costs for the collection and removal of the containers.
- Solid waste resulting from the empty beverage containers constitutes a significant and rapidly growing proportion of municipal solid waste and increases the cost and problems of effectively managing the disposal of the waste.
- It is difficult for local communities to raise the necessary capital to initiate comprehensive recycling programs.
- Several states have previously enacted and implemented state laws designed to protect the environment, conserve energy and material resources, and promote resource recovery of waste by requiring a refund value on the sale of all beverage containers and that these laws have proven inexpensive to administer and effective at reducing financial burdens on communities by internalizing the cost of recycling and litter control to the producers and consumers of beverages.
- A national system for requiring a refund value on the sale of all beverage containers would act as a positive incentive to individuals to clean up the environment and would a) result in a high level of reuse and recycling of the containers; and b) help reduce the costs associated with solid waste management.
- The reuse and recycling of empty beverage containers would eliminate unnecessary burdens on the Federal government, state and local governments, and the environment.
- The collection of unclaimed refunds from a national system of beverage container recycling would provide the resources necessary to assist comprehensive reuse and recycling programs throughout the United States.
- This Act is consistent with the goals established by the Administrator of the Environmental Protection Agency during January 1988 that include a national goal of 25 percent source reduction and recycling by 1992, coupled with a substantial slowing of the projected rate of increase in waste generation by 2000.

Finally, the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization that provides a broad-based forum in which member countries can compare their experiences, discuss the problems they share and seek solutions that can be applied within their national contexts, has produced a series of reports on Extended Producer

Responsibility, *i.e.*, Manufacturer's Responsibility. OECD recently issued a report entitled *Extended and Shared Producer Responsibility Phase 2 Framework Report*, that found that Manufacturer's Responsibility could be effective in the U.S. In essence, the report found that given economies of scale that could be achieved by industry groups in the U.S., Manufacturer's Responsibility would be cost effective and equitable.[7] In addition, the report found that government involvement could take the form of a law prescribing program elements and authorizing a responsible government agency to provide additional details and implementation oversight, or a law could require a government-industry negotiated agreement or "covenant" to establish Extended Producer Responsibility program elements.[8]

Despite these advances, it does not appear that a system of Manufacturer's Responsibility will soon be adopted in the U.S., particularly one that is as comprehensive as those developed in Europe in response to the EU Directive. Therefore, this paper addresses the potential to use the progress made in Europe and Asia to influence, primarily through non-legislative mechanisms, the packaging placed on the market in the U.S. and the manner in which it is managed.

IV. Case Studies

This section presents case studies of Manufacturer's Responsibility programs implemented in three European countries (Belgium, Germany and the U.K.) and one Asian country (Taiwan). While the case studies present background information on the programs and details, such as materials covered, the focus is on highlighting different approaches and, ultimately, to illustrate how these different approaches have implications for U.S. strategies to minimize domestic packaging waste.

Belgium

Background

Belgium, located in Western Europe, bordering the North Sea, between France and the Netherlands, is home to approximately 10 million people. Approximately 600,000 tonnes[9] of household packaging waste and nearly 1.6 million tonnes of total packaging waste is generated in Belgium each year. Belgium first adopted environmental packaging legislation on July 16, 1993. The 1993 law introduced a general framework for Manufacturer's Responsibility, as well as specific "eco taxes" for several items, including: "beverage containers, PVC beverage containers, industrial packaging, batteries, disposable items (razors and cameras), paper and paperboard."

In March 1997, in response to continuing environmental concerns regarding landfilling and incineration, and to the EU directive, Belgium approved an interregional environmental packaging waste agreement (an agreement between the three regions within Belgium—

[7] OECD Group on Pollution Prevention and Control, *Extended and Shared Producer Responsibility - Phase 2 Framework Report*, (ENV/EPOC/PPC(97)/20/REV2), May 13, 1998 and "OECD Report Assumes EPR would Work in U.S.," *Recycling Laws International, Special Recycling Bulletin*, April 27, 1998.

[8] "Producer Responsibility Programs Need Government Involvement," *Environmental Packaging*, August 1998.

[9] One metric ton (tonne) is equivalent to 1.1016 short tons.

Flanders, Wallonia, and Brussels). The agreement provides for packaging waste decrees for each region, sets recovery targets and requires takeback by entities placing packaging on the market. The Belgian law applies to packaging wastes generated by households and to industrial packaging wastes.

In addition to meeting the recovery targets, companies also must develop packaging waste prevention plans. Takeback, *i.e.*, collection of materials placed on the market or participation in a registered recovery system, is mandatory for all entities placing packaging on the market. In addition, all companies, other than those placing less than 10 tonnes of packaging a year on the Belgian market, are required to write a prevention plan.

In 1996, draft legislation was introduced to provide for a moratorium on the quantities of non-reusable packaging placed on the market. This legislation, however, has not yet been approved.

Role of Third Party Organizations

In anticipation of the takeback requirements established in the 1997 interregional agreement and in response to the 1993 legislation, in March 1994, representatives from affected industries established an industry organization, FOST Plus, to provide for the collection and management of household packaging wastes. FOST Plus members are licensed to display the Green Dot on their packaging. The Green Dot was originally a sign of compliance in Germany but now is licensed in several European countries through an organization called Pro-Europe.

FOST Plus officially began operation in January 1995. In December 1997, FOST Plus received final government approval and direction on the types of packaging it would be allowed to cover. Prior to this approval, FOST Plus had operated on a voluntary basis. FOST Plus is responsible for ensuring proper management of all household packaging and commercial waste, for member companies, in Belgium. FOST Plus has signed contracts with various material associations, representing the paper/cardboard, glass, metals, PET bottles, plastic bottles and beverage cartons industries. These contracts specify the type and amount of packaging to take back. FOST Plus assumes responsibility for marketing materials for recycling to meet the established recycling goals.

FOST Plus is approved only to manage household packaging covered under the Agreement, hence, another industry organization, VAL-I-PAK, has been established to handle the collection and recovery of industrial packaging. Like FOST Plus, once approved, VAL-I-PAK will work together with firms that already collect and recycle packaging materials to ensure that member companies can meet the legislative requirements. Negotiations are still under way to determine who will be responsible for "commercial" packaging waste, such as takeout restaurant packaging.

Program Goals

The Belgian packaging law applies to primary (*i.e.*, sales), secondary (*i.e.*, display), and tertiary (*i.e.*, transport) packaging. General targets established by the Interregional Agreement are presented in Exhibit 2.

Exhibit 2: Belgium Recycling and Recovery Targets

Category	1996	1997	1998	1999
Recycling	35%	40%	45%	50%
Total Recovery*	50%	60%	70%	80%

*Includes incineration with energy recovery.

In addition to the general targets, specific recovery targets have been established for containers. These are presented in Exhibit 3.

Exhibit 3: Specific Recovery Targets for Belgium

Material	1996	1997	1998	1999	2000
Glass	55%	62%	67%	73%	80%
Metal	40%	47.5%	58%	64%	80%
Plastics	20%	30%	43%	56%	70%
Beverage cartons	20%	30%	43%	56%	70%

Current Reporting Requirements

FOST Plus is responsible for establishing the fees paid by manufacturers on consumer sales and transport packaging. The fees established for 1998 are presented in Exhibit 4.

Exhibit 4: FOST Plus Fees[10]

Material	BF/Kg	$/Kg
Aluminum	2.96	$0.09
Steel	1.34	$0.04
Glass	0.31	$0.01
Paper	0.33	$0.01
HDPE Bottles	8.27	$0.27
PET Bottles	8.21	$0.26
PVC Bottles	8.27	$0.27
Beverage Cartons	5.7	$0.18
Other (including plastics other than bottles)	13.63	$0.44

Containers that are designed to be refilled at least seven times and non-refillable containers that achieve specified recycling rates are exempt. Beverage containers that fail to meet recycling targets are subject to the eco tax, plus a fine. For beverage containers, the tax is 15 BF per container (regardless of size or material). Fees have not yet been established for most industrial packaging materials subject to the Interregional Agreement.

All products or containers subject to the eco tax law must be marketed with a symbol indicating that the item is 1) a recyclable subject to the tax, with the amount of the tax indicated on the label; 2) a recyclable exempt from the tax; or 3) reusable, also with the deposit amount of the tax indicated. Taxes are paid by wholesalers, who must register with the Ministry of Finance. Alternatively, when a product is not offered through a wholesaler, producers and importers must register. The registration number must appear on labels that are applied to subject containers.

Proposed Reporting Requirements

Additional reporting requirements and fees will be enacted for industrial packaging, likely by late 1998 or early 1999. As part of this process, packaging associated with Information Technology (IT) products (*e.g.*, computers), may be considered industrial packaging. If this change is made,

[10] Approximate exchange rate of 0.32175 BF per US$, as of May 1998.

IT packaging would fall under the purview of VAL-I-PAK rather than, as it currently does, FOST Plus. This change could change fee arrangements and labeling requirements for all IT packaging.

Implementation Successes and Obstacles

FOST Plus did not receive official approval to collect and manage household and equivalent waste until December 1997, after two years of operation on a voluntary basis. This voluntary start-up period appears to have been successful. Data for 1997 indicate that 410,480 tonnes of empty packaging was recycled by FOST Plus for member companies in 1997. This represents approximately 60 percent of the packaging placed on the market by FOST Plus members, which is equivalent to the national recycling goal for 1997. Material specific recycling rates are presented in Exhibit 5.

Exhibit 5: Recycling of FOST Plus Member Packaging

Material	Tonnes Recycled	Percent
Paper-carton	144,800	80.1%
Glass	197,287	70.5%
Plastics	19,711	16.3%
Metals	82,500	59.0%
Others	N/A	N/A

In addition to recycling a significant quantity of the packaging placed on the market by member companies, FOST Plus' membership increased notably from 1995, its first year of operation, to 1997. In 1995, FOST Plus had 550 members. By 1996, this increased to 1,746 members, and in 1997, FOST Plus had 3,174 member companies. Of the 1997 total, 379 were foreign-based companies.

More important, the number of packaging data sheets received by FOST Plus increased by 80 percent from 1996 to 1997, signifying that companies are beginning to participate actively in the Manufacturer's Responsibility program.

Finally, with the recycling success has come financial success. According to FOST Plus' annual report, FOST Plus' balance sheet approached BF 1.5 billion in 1997, and after all recycling and other activities were accounted for, FOST Plus reported a profit of BF 9 million.

Impact on Manufacturers

Because FOST Plus did not receive official approval until late 1997, its emphasis in 1997 was on working with member companies to optimize packaging. FOST Plus conducted numerous seminars and outreach activities to work with member companies in this area and solicited documented examples of packaging optimization from members. In response, FOST Plus received 263 Responsible Packaging Dossiers, 172 of which were published in FOST Plus' December 1997 publication, *As Little As Possible, As Much As Necessary*. The majority of these (66) were for reduction in packaging weight. FOST Plus selected three easy-to-define products to study in greater detail and found that members had reduced the weight of 1.5 liter PET water bottles by 5.3 percent; reduced the weight of 450 gram glass jam jars by 0.7 percent, and reduced the weight of 400 gram tin (in steel) preserved vegetable or fruit containers by 11.7 percent. Exhibit 6 presents the results of the packaging optimization project, in terms of the number of packaging optimization examples published under each category.[11]

[11] FOST Plus, *Annual Report 1997*.

Summary

The Belgian Manufacturer's Responsibility program has many unique aspects. Primary among these is its emphasis on source reduction and the requirement that all manufacturers in Belgium prepare source reduction plans. The preliminary success of this approach is seen in the number of Responsible Packaging Dossiers received by FOST Plus as a result of its outreach activities. Belgium also highlights the potential for success of a voluntary Manufacturer's Responsibility program. Although background legislation was in place, FOST Plus operated successfully for over two years on a voluntary basis before receiving official government approval. During the time FOST Plus was operating on a voluntary basis, over 2,000 companies joined FOST Plus and began paying into the system to establish a recycling infrastructure for their packaging materials.

Germany

Background

Germany, with a population of approximately 87 million and a land area approximately equal in size to Montana, produces approximately 35 million tonnes of municipal solid waste each year, about 40 percent, or 15 million tonnes, of which is household waste. Of the total solid waste produced in Germany, approximately 50 percent by volume, or 30 percent by weight, is packaging waste. In 1986, in an effort to reduce the quantity of packaging waste disposed in the country, the German Legislature passed the Federal German Waste Products Act, amending the 1972 Act on Waste Avoidance and the Disposal of Waste. The aims of the 1986 Act were to 1) ensure that packaging is produced from materials which are "environmentally friendly" and which do not place a burden on the recycling system; and 2) guarantee that waste from packaging is prevented by ensuring that:

- the volume and weight of the packaging is restricted to the minimum necessary to protect the contents and for marketing purposes,
- packaging is produced in such a way as to make it refillable as far as this is technically possible and reasonable and is within the bounds of any regulations governing contents, and
- packaging can be recycled if it cannot be refilled.

After several years of legal dispute, the 1986 Act resulted in the Directive on the Prevention of Packaging Waste of October 1991 (Packaging Ordinance). This directive mandates that manufacturers in Germany take back their packaging and either recycle or reuse it. The packaging regulations were implemented in three phases:

- As of December 1991, all *transport packaging* used to move goods in Germany was required to be accepted back by manufacturers and distributors. Transport packaging includes crates, drums, pallets and polystyrene containers.
- As of April 1992, manufacturers, distributors and retailers were required to accept all returned *secondary packaging*, such as linerboard or cardboard boxes. Secondary

packaging is defined as that designed to prevent theft or for promotional/ advertising purposes.

- As of January 1993, retailers, distributors and manufacturers were obligated to accept *sales packaging* brought back by consumers. Sales packaging includes all types of packaging necessary to contain and transport goods up to the point of sale or consumption, such as cans, plastic containers (*e.g.*, milk/soda bottles), foil wrapping, polystyrene and paperboard packages. Additionally, a mandatory deposit was placed on nonrefillable beverage containers, washing and cleaning agent containers and emulsion (water-based) paint containers.

Exhibit 6: Number of Packaging Optimization Examples Published by FOST Plus

Category	Number of Published Dossiers
Reduction in Packaging Weight	66
Towards more recycled materials	16
Towards a mono material	15
Re-use for the same use	15
Partial or total removal	11
Recharging	10
Changing the packaging material	9
Transport	6
Concentrated, compacted products	5
Increase in the packaging content	5
Qualitative prevention	5
Separation, sorting, recycling	5
Re-use for a different use	3
Standardization	2

Finally, in September 1994, Germany passed the "Closed Loop Economy Law," which broadens the Packaging Ordinance by calling for manufacturers to eliminate as much production waste as possible and to ensure that goods are properly recycled or destroyed after use. The Closed Loop Economy Law broadens the scope of Manufacturer's Responsibility beyond packaging to include almost all consumer goods in a cradle-to-grave system. This law was scheduled to take effect on October 7, 1996. However, Germany first is considering revising the original packaging ordinance to reflect the EU directive on packaging. Through this revision, Germany could relax the mandatory recovery rate for plastics and composites from 64 percent to the 50 percent mandated by the EU directive.

Role of Third Party Organizations

Several different Third Party Organizations have been formed to comply with the Packaging Ordinance. The primary, and original, Third Party Organization is Duales System Deutschland AG (DSD). DSD was established to fulfill obligations related to primary packaging under the Packaging Ordinance. Recycling is subcontracted by DSD or may be handled by processors. A new Third Party Organization recently received official recognition to collect the same type of packaging as DSD in Lahn Dill county in the state of Hessen. This organization, Landbell AG, began operation in May 1998, and according to reports operates more cheaply than DSD. In the future, it may compete with DSD throughout Germany.[12]

Other Third Party Organizations in Germany include RESY GmbH, which was established by the corrugated cardboard industry to collect and recycle cardboard boxes; VHP GmbH, which was established to assist companies with wood packaging; and RKW RG Verpackung, which promotes use of multi-trip plastic crates (now required under the German law); and Intersoh, which handles transport packaging.

[12] "New Organizations Compete with DSD," *Environmental Packaging*, August 1998.

Program Goals

The Ordinance requires 72 percent of containers on the market for beer, water, soft drinks, juices, nectars and wines to be refillable; while 17 percent of milk containers must be refillable. The Ordinance also requires that the minimum market share of refillable beverage containers increase to 75 percent by 1996, 78 percent by 1998 and 81 percent by 2000. In addition, a series of legislative acts have established collection, sorting and recycling goals. These goals are presented in Exhibit 7.[13]

Exhibit 7: German Collection, Sorting and Recycling Quotas

Material	Collection Quotas		Sorting Quotas		Recycling Quotas		Recycling Quotas
	1993	1995	1993	1995	1993	1995	1998
Glass	60	80	70	90	42	72	75
Tinplate	40	80	65	90	26	72	70
Aluminum	30	80	60	90	18	72	60
Paper/Paperboard	30	80	60	80	18	64	70
Plastic	30	80	30	80	9	64	60
Composite	20	80	30	80	6	64	60

Current Reporting Requirements

The Packaging Ordinance applies to anyone who commercially places packaging on the German market, *i.e.*, distributors, manufacturers and importers of packaging, including direct mail-order companies. The Green Dot licensing fees established for packaging materials are presented in Exhibit 8.

Exhibit 8: Green Dot Licensing Fees[14]

Material	DM/Kg	$/Kg
Aluminum	1.5	$0.99
Tinplate	0.56	$0.37
Glass	0.15	$0.10
Paper/paperboard	0.4	$0.26
Plastics	2.95	$1.95
Cartons for Liquids	1.69	$1.12
Other Composites	2.1	$1.39
Natural Materials	0.2	$0.13

Proposed Reporting Requirements

Draft legislation in Germany contains provisions for new targets for 1998, but the major change is that DSD has announced that it will be cutting its fees by about $700 million in the next five

[13] Note in Exhibit 7 that draft legislation would create new recycling quotas for 1998, while collection and sorting quotas would remain the same.

[14] Approximate exchange rate of 0.6622517 DM per US$, as of May 1998.

years as system efficiencies increase and the costs associated with collecting, sorting and recycling the materials decrease. DSD has negotiated with recyclers to cut costs by installing high-tech, fully automated sorting systems that could reduce overall system costs from approximately DM4.1 billion per year to DM3.4 billion per year. On a per capita basis, this equates to a decrease from DM49 ($78.60) per person per year to DM41 ($65.78) per person per year.

Implementation Successes and Obstacles

As the first comprehensive Manufacturer's Responsibility program, DSD faced many tough challenges at its inception, and was widely criticized as ineffective. The most immediate obstacle was funding the collection, distribution and recycling system, the cost of which is estimated at approximately $2.1 billion per year in 1991 dollars, after the initial start-up cost of about $4.2 billion. The main factor contributing to DSD's initial financial problems was that it collected approximately four times the expected quantity of materials in the first year, compounded by the fact that the Green Dot licensing fee had been paid on only 60 percent of these materials.

In response to the funding crisis, DSD established what appears to be an effective funding mechanism. The initial fee system was volume-based, which essentially treated all packaging materials equally, regardless of their weight or recyclability. This also may have had the unintended effect of encouraging the use of harder to recycle plastic packaging materials. The revised system places greater emphasis in the fee structure on the recyclability of materials, as is indicated by the fee schedule presented in Exhibit 8. In addition to the recyclability/weight-based fees, additional fees are levied based on the volume of the package. These volume-based fees range from approximately 0.06 cents to 0.12 cents per unit.

The second modification made to the system to ensure adequate funding was to allow wholesalers and retailers to withhold from manufacturers funds owed to DSD if proof is not provided to the retailers that the appropriate fees have been paid to DSD. This is only the case for products displaying the Green Dot. The result is that use of the Green Dot is no longer sufficient proof of payment of fees, a measure instituted primarily to prevent fraud.

Although the obstacles initially were many, the Duales System ultimately achieved notable success, especially in the area of packaging reduction. Specific reductions are presented in Exhibit 9. While 25 million tonnes of recyclable material were sent to recycling by the Duales System from 1991 to 1997, manufacturers marketing products in Germany modified and lightweighted packaging to achieve a reduction in sales packaging of about 900,000 tonnes over the same period. On a per capita basis, packaging consumption dropped from 94.7 kilograms in 1991 to 82.3 kilograms per person in 1997; a decrease of approximately 13 percent. Some of the reduction in packaging may be attributed to the sluggish economy and the difficult reunification effort in the early 1990s, when the German economy underwent a severe transformation with the

Exhibit 9: Changes in Packaging Consumption in Germany ('91–'95)

Material	Percent Change ('91–'95)
Glass	-15.9%
Tinplate	-17.7%
Aluminum	-21.5%
Plastic	-3.9%
Board/Paper	-5/8%
Composite*	-5.2%
Steel	-26%
Wood, Cork	-14%
Other	-11%
Total	-10.8%

*Includes beverage cartons, paper-based aluminum-based.

merger of East and West Germany into one country. Between 1992 and 1995, the former West Germany helped the former East Germany to average nearly eight percent annual economic growth, although, taken as a whole, the German economy averaged less than two percent annual growth over this period. Nevertheless, there does appear to have been a real reduction in the volume of material used to package items for shipping, display and sales.

DSD now reports that the restructured funding mechanism and successful efforts to renegotiate contracts with the waste management industry have helped to keep waste management costs from rising at the same rate as the volume handled. Based on figures available from DSD, it appears that the overall cost per ton of managing and recycling waste has gone down. In 1995, total costs to DSD were DM3.86 billion ($2.70 billion), which equates to approximately $458 per ton collected or $498 per ton recycled, after converting German marks to dollars and metric tons to short tons. In 1997, total costs to DSD were DM4.0 billion ($2.79 billion), which equates to approximately $452 per ton collected or $465 per ton recycled, based on the 1995 exchange rate.[15]

Figures are not available on the actual cost per ton for the specific materials collected and recycled under the DSD system. However, experts familiar with the system estimate that half, or more, of the total costs may be associated with collection, sorting, and recycling of plastics.[16]

In 1997, DSD fulfilled the collection targets set by the Packaging Ordinance on a nationwide basis and forwarded the necessary quantities for recycling. The individual figures for both 1996 and 1997 are as follows: 2.74 million tonnes for glass (1996: 2.69 million tonnes), 1.37 million tonnes for paper and cardboard (1996: 1.32 million tonnes), 567 thousand tonnes for plastic (1996: 535 thousand tonnes), 312 thousand tonnes for tinplate (1996: 302 thousand tonnes), 40 thousand tonnes for aluminum (1996: 36 thousand tonnes) and 420 thousand tonnes for composites (1996: 445 thousand tonnes). In addition to meeting the national goals, DSD also posted its first profitable year in 1997, with the changes to the system that make free-riding, *i.e.*, displaying a certification of compliance on packaging while not actually paying into the system, much more difficult, receiving much of the credit for the positive balance sheet.[17]

Impact on Manufacturers

The best gauge of the effectiveness of Manufacturer's Responsibility, in terms of waste prevention and recyclability, is whether manufacturers and packagers change their packaging in response to the system. Evidence from the first two years of DSD's operation seems to indicate that making manufacturers responsible for their waste has had a substantial impact on the quantity of waste that is generated.

According to published data, packaging generation in Germany declined approximately 4.5 percent between 1991 and 1992 and approximately 10.8 percent between 1991 and 1995. Material specific changes for 1991 to 1995 are presented in Exhibit 9.[18]

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[15] Duales System Deutschland, "Presseinformation," May 1996/May 1998.

[16] Personal communication, Colton Seale, SAIC with Bette Fishbein, INFORM, October 6, 1996.

[17] DSD, "Successful 1997 financial year for the Dual System Cost savings bring licensees around DM200 million," Cologne, June 25, 1998.

[18] Data are from Development of the Use of Packaging 1992/1995; Estimated Forecast prepared by the German Environment Ministry and Fishbein, Bette, *Germany, Garbage, and the Green Dot*, INFORM, 1994. Reported in Raymond Communications Inc., *Getting Green Dotted: The German Recycling Law Explained in Plain English*, 1994.

A 1992 study, by the German Ministry of the Environment, found that manufacturers were moving toward more recyclable polyethylene and polypropylene packaging and away from the more difficult to recycle polyvinyl chloride (PVC) packaging materials, indicating that perhaps success was being achieved within the plastics industry in terms of identifying ways to successfully package different items in easier to recycle plastics. A 1995 study by the Ministry found that solid waste sent to disposal decreased 10 percent between 1990 and 1995, while recycling increased 17 percent. These data indicate that the Packaging Ordinance has had a significant impact in changing the waste stream and diverting waste from disposal, although many still argue that the system puts too much emphasis on recycling and end-of-life management and not enough emphasis on source reduction and reusable packaging alternatives. Alternatively, many argue that the system still places too much emphasis on lighter, but hard to recycle materials, such as plastics.

Summary

The German experience with Manufacturer's Responsibility provided many valuable lessons to the other countries that were to follow with similar programs. The first was to ensure that, before targets are set and the program comes on line, there is sufficient capacity available to handle the quantity of materials that will be accepted. In other words, market development is the most important first step in developing Manufacturer's Responsibility. Germany also learned that there has to be a credible and enforceable mechanism to ensure that companies using the system pay into the system, or the system will go broke paying for free riders, as DSD did in the first years of the Green Dot. The German experience has been expensive but costs are going down each year and DSD was profitable for the first time in 1997. More important, however, is that the German program has been successful in dramatically increasing the recycling rate in Germany while also encouraging source reduction and helping to decrease the overall quantity of packaging materials placed on the German market.

United Kingdom

Background

The United Kingdom (U.K.), which consists of England, Scotland, Wales and Northern Ireland, is home to approximately 57.6 million people. The total land area in the U.K. is 241,590 square kilometers, about the size of Oregon. The U.K. generates approximately 8 million tonnes of packaging waste each year. Recently, increasing exports and manufacturing growth have helped to spur the U.K. economy that had slumped significantly during the early 1990s and to reduce unemployment in the U.K.

In 1993, the U.K. launched a voluntary "Producer Responsibility Initiative." The Environment Act of 1995 gave the U.K. Government the power to introduce a "producer responsibility" packaging waste recovery law that set out the legal responsibility of producers for packaging and also set targets in line with the EU Directive. The Producer Responsibility Obligations (Packaging Waste) Regulations of 1997 implement the EU Directive 94/62/EC and establish legal obligations to ensure that recovery and recycling targets are achieved.

The U.K. system is unique in the E.U. because the U.K. has adopted Shared Responsibility rather than strict Manufacturer's Responsibility. In the U.K., packaging obligations are divided among raw material producers, packaging manufacturers, packers/fillers and anyone that sells the packaged product to the final consumer. Canada also has proposed a form of Shared Responsibility. However, the Canadian system will divide responsibility primarily between manufacturers and the government agencies involved with waste management, rather than among the different links in the packaging chain.

Role of Third Party Organizations

Third Party Organizations in the U.K. assume the responsibility for the recovery and recycling obligations of companies covered under the 1995 Environment Act. As part of their role, the Third Party Organizations, known in the U.K. as "collective schemes," register their members with the Environment Agency (EA), or the Scottish Environmental Protection Agency (SEPA) for businesses whose principal place of business is Scotland, and pay a fee on their behalf. Additionally, the Third Party Organizations negotiate with reprocessors and recyclers for the purchase of Packaging Recovery Notes (PRNs). These documents prove that a given tonnage of reprocessing has taken place. The packaging notes can replace all or part of the fee for recycling and recovery. The Third Party Organizations determine the fees using the recovery and recycling rates and the tonnage of a packaging material placed on the market by their member companies. The fee is paid in PRNs and, if necessary, British Pounds per ton of material to the Environment Agency to ensure their members' compliance with the recovery and recycling obligations. Companies also may register on their own behalf and pay directly to the EA or SEPA without taking part in a collective scheme.

To date, the EA has recognized seven Third Party Organizations. These are: Valpak, Wastepak, Biffpak, Wespak, Properpak, Jempak and Recycle UK. Valpak is the largest of the collective schemes, with more than 2,000 members to date. Businesses can join the recycling organization that best suits their individual needs.

Program Goals

The targets for recovery and recycling are being phased in gradually. Starting in 1998, each company doing business in the U.K. will have to ensure, either individually or through a collective scheme, that enough waste is recovered or recycled to meet its obligations. These obligations (in tonnes) are calculated on the basis of the recovery and recycling targets together with the percentage activity obligation and the tonnage of packaging handled. The targets are set on an incremental scale, with full recovery and recycling targets set to be reached by 2001. The Environment Agency established the targets presented in Exhibit 10.

The targets presented in Exhibit 10 are for all packaging subject to the Environment Act. In addition, the Environment Agency has set the goal of 50% recycling of all household waste by the year 2000. With this, the Agency also established minimum efficiencies for recycling, based on the material and the type of

Exhibit 10: U.K. Packaging Recovery and Recycling Targets

Target	1998	1999	2000	2001+
Recovery Target	38%	38%	43%	52%
Recycling Target	7%	7%	11%	16%

reprocessor. Specified minimum efficiencies are presented in Exhibit 11. The term "minimum efficiency" refers to the quantity of material that is collected that must actually be recycled. For example, for paper/board packaging, as shown in Exhibit 11, if 100 tonnes are collected, at least 85 tonnes must be sorted for recycling.

Current Reporting Requirements

Responsibility for packaging is divided among the various members of the packaging production chain. Specifically, the obligations are divided as follows:

- raw material producers - 6 percent,
- packaging manufacturers - 11 percent,
- packers/fillers - 36 percent, and
- any company that sells the packaged product to the final consumer - 47 percent.

Exhibit 11: Specified U.K. Recycling Efficiencies

Material Type and Place	Minimum Efficiency for Recycling
Paper/board packaging	85%
Glass - at the container works	98%
Glass - at the cullet processing facility	96%
Steel - foundry, BOS, electric arc	98%
Steel - detinning plant	89%
Aluminum	98%
Plastics	75%

Currently, only businesses that handle more than 50 tonnes of packaging a year and achieve an annual turnover of more than £5 million are responsible for meeting recovery and recycling obligations in 1998. From January 1, 1998, recovery and recycling of paper/fiberboard, glass, steel, aluminum and plastic will be covered by accreditation. The Environment Agency has launched a voluntary accreditation scheme for packaging waste reprocessors. The Producer Responsibility Unit at the Environment Agency will only issue official packaging waste recovery notes (PRN's) to accredited reprocessors, who then will supply these for packaging waste received. Companies obligated under the Packaging Regulations can still use unaccredited reprocessors, but they will have to provide evidence of recycling, *i.e.*, audit trails, to prove they have complied with the regulations.

Fees are established by the Third Party Organizations and can be adjusted each year according to the market for the materials, the quantity of material collected and recycled, and the processing and handling costs of the material. For example, fees based on actual costs to Valpak and member companies essentially are billed retroactively, once the true cost of managing materials has been established. A company's fee is calculated by:

1) taking its percent of obligation for the total amount of each packaging material with which the company is associated placed on the market (*e.g.*, 47 percent for retailers);
2) calculating the percent of that figure for which there is an obligation (currently 38 percent for recovery and 7 percent for recycling);
3) subtracting the quantity for which the company has recovery or recycling PRNs; and finally
4) calculating the recovery and recycling fees for the remaining quantity of material.

Ultimately, then, a company will only pay fees on a relatively limited portion of the overall packaging with which it may be associated. So, although the fees appear unusually high, it is

important to recognize that these fees are paid only on a portion of the total packaging introduced by a given company. Exhibit 12 presents draft ranges established by Valpak for its 1998 fees, as well as actual fees that have been reported to SAIC for recovery and recycling obligations.

Exhibit 12. Preliminary Valpak Fee Schedule[19]

Material	Range £/Tonne	Actual Reported Fees £/Tonne		$/Tonne
		Recovery	Recycling	
Aluminum	23 - 28	31.23	20	$35.89 - $43.69
Steel	30 - 40	34.54	22.75	$46.82 - $62.42
Glass	14 - 25	27.17	20	$21.85 - $39.01
Paper	25 - 35	40.76	31	$39.01 - $54.62
Plastic	50 - 100	32.70	155.39	$78.03 - $156.05

Proposed Reporting Requirements

After January 2000, businesses with a turnover between £1 million and £5 million will also be responsible for calculating and paying their packaging obligations. At this time, wholesalers also will be required to fulfill the obligations of their customers that fall between the £1 and £5 million threshold. In addition, beginning January 1, 2000, wood and "other" (cork, jute, textiles, ceramics, etc.) packaging waste will be included in the takeback structure. While these requirements are, at present, scheduled to take effect in January 2000, the system thus far has seen a great deal of change and these could be modified prior to that date.

Implementation Successes and Obstacles

In 1998, the U.K. landfilled approximately 85 percent of its waste and recycled approximately 7 percent of the total waste generated. At present each city in the U.K. is responsible for managing its own waste. Because of this, coordination among the cities has thus far been difficult and development of new recycling capacity, sufficient to meet the requirements of the packaging legislation, has been slow in developing. With the slow development of recycling, Third Party Organizations, notably those other than Valpak, which was first on the scene, have had a difficult time contracting with sufficient capacity to meet their members' needs. A draft waste strategy is expected in 1999 to help address some of these issues.[20]

Understanding the requirements necessary to be in compliance has been another obstacle to smooth implementation. The U.K. Environment Agency identified four barriers to compliance with the U.K. regulations. These are: 1) difficulty with administrative systems, 2) extensive data requirements, 3) inability to obtain accurate guidance on data collection and reporting, and

[19] These fees are based on SAIC's calculations for one company in fulfilling its reporting requirements. While they are deemed correct, we have elected also to report Valpak's reported ranges. Valpak's fees may be modified once actual rates are calculated by individual companies. Approximate exchange rate of 1.560501 Pounds per US$, as of May, 1998.

[20] U.K., Department of Environment. *Producer Responsibility Obligations (Packaging Waste) Regulations, 1997 Users Guide.* 1997.

4) a lack of understanding of the different responsibilities of the various agencies and other parties' roles. Possibly the most significant problem is that businesses are not always clear about what type of business they are required to register as and about what is their actual obligation. For example, an importer may actually be responsible for 100 percent of the obligation if it imports and sells in the U.K. For companies that fulfill many roles, and especially those that only fulfill a role, *e.g.*, manufacturers, at certain times, the picture becomes much less clear.

Businesses remain confused about who is responsible for accepting and processing registrations and who should receive data. Although the Environment Agency strives to deliver local service, registration is handled through a central organization, a Producer Responsibility Registration Unit, while questions are handled through local offices. The Agency continues to offer training to staff in local offices to better serve affected industry.

Considerable confusion persists among the regulated community concerning how to estimate data for 1996. Businesses experience difficulty estimating data when no pertinent information was collected at that time. The current standard, "producer's reasonable estimates," leaves room for flexibility and for misunderstanding by both businesses and Agency staff. In 2000, the guidance will read "as accurate as reasonably possible." Many still anticipate different interpretations of the guidance and expect that businesses will continue to struggle to understand what they are required to report.

In addition, businesses continue to express confusion over many of the definitions used in the U.K. regulations, such as the definition of special producers and the requirements placed on special producer packaging. Special producer packaging will have contained or may have been contaminated by a special (*i.e.*, hazardous) waste. The special producers recognize that special producer packaging counts toward the 50 tonne threshold but no specific recovery or recycling obligations have been specified for the packaging. Special producers are required to report on special packaging and to take steps to recover and to recycle the packaging through a separate system. Industry trade groups, such as the Pallet Confederation and the Fresh Produce Consortium, have been helpful in issuing guidance to their members.

Despite these administrative obstacles and the belief that the U.K. system is one of the most complicated systems in the EU, there are several reported successes as a result of the program. Of 4,000 businesses required to register under the Regulations, more than 3,850 are registered or are in compliance schemes according to the U.K. Environment Agency. Valpak, the country's largest Third Party Organization, has more than 2,200 members. Businesses have an even greater choice of compliance schemes in 1998 than they had in 1997, and new organizations continue to come online.

At this early stage, the PRN system also is being considered a success. The revenue generated from the PRNs supports investment in reprocessing capacity and stimulates end market use. The PRN system offers a market driven approach and according to representatives from Valpak, the approach is beginning to work. The revenues from PRNs must drive expansion of collection. Currently, the recovery/recycling of paper/fiberboard, glass, steel, aluminum and plastic are covered by accredited reprocessors. As of January 2000, wood and other packaging waste will be included and reprocessors will be required to be accredited.

Valpak estimates putting approximately £60 million (~$90 million) into the system in 1998 and reports that, by working with industry to set focused objectives, they will meet the required obligations. Valpak also supports businesses by negotiating effective contracts with reprocessors. Active Third Party Organizations understand the materials market, provide financial incentives and promote the end markets for recovered materials. Effective promotion of the use of recycled products is critical for success of the collection and recovery schemes.

Impact on Manufacturers

Concern has been expressed regarding the impact of the Packaging Waste Regulations on re-usable and other types of long life transport packaging such as pallets and drums. The concern centers on the possibility that companies may send potentially re-usable packaging for reprocessing rather than re-use in order to achieve and prove compliance with their recycling obligations. Clearly this response is contrary to the overall intention of the regulations and attempts are being made to exempt such packaging from the Packaging Waste Regulations.

In addition, PRNs are the subject of much discussion and speculation in terms of their impact on packaging waste recovery and recycling costs, particularly their potential market value for businesses and their influence on compliance with the regulations by producers, reprocessors, compliance scheme operators, etc. Based on preliminary reports, the PRN-based system may be slowing the effective adoption by some businesses of plans to fulfill their regulatory requirements.

Summary

The U.K. has adopted an innovative system of Shared Responsibility, rather than Manufacturer's Responsibility, to spread the cost of managing packaging waste across a much broader range of entities responsible for the generation and use of the packaging. In addition, the U.K. has taken a slightly more market driven approach with the use of packaging recovery notes issued to accredited processors.

Taiwan

Background

In 1996, the approximately 21.7 million residents of Taiwan produced more than 8.7 million tonnes of solid waste. Exact figures are not available regarding the percent of this that is household packaging waste, but the Taiwan EPA estimates that approximately 29 percent of the waste is paper, approximately 19.5 percent is plastic, and overall, approximately 60 percent of the waste is recyclable.[21] Therefore, if it is estimated that 50 percent of the total municipal solid waste generation is packaging waste, Taiwan generates approximately 4.35 million tonnes per year of household packaging waste. This quantity of solid waste equates to 240 tonnes per square kilometer. Taiwan is relatively small — slightly smaller than Maryland and Delaware combined. To handle this amount of waste with the lack of available land for land disposal, it has been estimated that twenty-eight 900 ton per day incinerators would be required. Forty to 50 percent of this total waste stream is thought to be recyclable.[22]

[21] Personal communication, Colton Seale, SAIC with Taiwan EPA, August 15, 1998.
[22] "A Word from the Bureau of Solid Waste Control," *Environmental Policy Monthly*, November 1997.

Taiwan passed its original recycling law in 1988 and introduced recycling goals for consumer packaging in 1993. The original goals were vague, not specifying who exactly was responsible for meeting the recycling targets (*e.g.*, manufacturers, distributors, etc.) The new Resource Recycling and Reuse Act, last revised in 1997, and expected to be finalized during 1998, places the responsibility for paying for recycling of packaging from goods made in Taiwan on the supplier of the packaged consumer goods. For imported goods, the importer is responsible.

With the new law, Taiwan has attempted to take a more market-driven approach by placing the emphasis on compulsory payment of waste disposal fees rather than on recycling rates and targets. Recycling targets have been set, but the new regulations established lower initial targets and allow for targets and fees to be adjusted, once recycling data are available, to reflect actual market conditions. This approach is based on the belief that companies will be more motivated by the potential to lower fees, by reducing the quantity of material placed on the market and increasing the percent that is collected, rather than by mandated recycling rates.

In addition to taking a more market-based approach to recycling, the Act focuses on waste prevention, requiring that manufacturers record their use of virgin and recycled resources. While recordkeeping, in itself, does not necessarily lead to waste prevention, the expressed hope of the Taiwan EPA is that when companies record, and perhaps make public, their relative use of virgin and recycled materials, it will help implicitly to promote three goals: 1) to make the companies aware of how much of a material they use and to provide a benchmark for reducing consumption; 2) to provide an awareness within the company of areas in which they could potentially increase use of recycled resources and to provide a benchmark; and 3) to make the public aware of the type and quantity of resources used by a company and hopefully put the company under public scrutiny to modify some of its material uses.

The Taiwan EPA also has taken the lead in establishing an eco-labeling system to promote products that, among other things, contain recycled content and to promote the development of recycling facilities, including planning for the integration of recycling capacity into the development of industrial parks. The Government Purchasing Act, passed by the Taiwan Legislature on May 1, 1998, specifies that government agencies must stipulate in their bid invitations that preference be given to products displaying the government-recognized Green Mark eco-labeling scheme where the performance of such products is either the same or similar to other products that perform the same function and with a price gap of less than 10%. The same preference will also be given to products or raw materials that are manufactured, used and their waste treated according to methods that utilize recycled materials and create recyclable, low pollution or energy conserving products or raw materials.

Role of Third Party Organizations

Taiwan does not have Third Party Organizations in the European sense. Instead, the new Waste Disposal Act allows the Taiwan EPA to form Fund Management Committees and Fee Management Committees for the designated materials to adjust recycling targets and fees. In addition, the Committees are responsible for registering non-profit corporations to set up the collection and recycling infrastructure for each material. These registered, non-profit

corporations do not have the range of power afforded most of the Third Party Organizations in Europe, nor are they run on a for-profit basis, as are the European organizations.

Historically, Taiwan did have a system that more closely resembled the European system of Third Party Organizations. However, the new system in Taiwan, unlike the old system, is not coordinated by industry. According to the Taiwan EPA, the new system design is intended to increase coordination between collection and recycling organizations and to involve more recyclers and capture more material than the old industry-organized system.

Program Goals

The Taiwan EPA has established a baseline target recycling rate of 40 percent for each material. According to the EPA, "In order to ensure that recycling fee rates are not continually raised when recycling targets are not met, the Fund Management Committee will evaluate any performance that falls below recycling rate targets during the early stages of the system. If the Fund Management Committee's actual recycling rates are less than 40 percent, the Fee Review Committee will raise the next year's recycling fee rates. Conversely, if the actual recycling rates for a given item exceed an upper limit, the Fee Review Committee may lower the respective recycling fee rate in the following year."[23]

Current Reporting Requirements

Manufacturers and importers are required to register with the Taiwan Resource Recovery Fund Commission, as well as to label covered containers with appropriate recycling symbols, material type and recovered content descriptions. Manufacturers and importers must submit recycling

Exhibit 13: Taiwan Fee Structure[24]

Material	NT$/Kg	$/Kg
Aluminum	3.93/3.5 with attached tabs	$0.14/$0.13
Iron	3.16/2.8 with attached tabs	$0.11/$.10
Glass	3.23	$0.09
Paper	3.94	$0.11
PET	14.01+0.70 per bottle*	$0.40+$0.02 per bottle
PET single material	3.01+0.70 per bottle*	$0.08+$0.02 per bottle
PVC	19.55+0.70 per bottle*	$0.56+$0.02 per bottle
Foamed PS	42.57	$1.23
Non-foamed PS	9.00	$0.26
PP, PE, other plastics	12.03	$0.35
single material PP, PE, other plastics	11.03	$0.32
Aseptic	11.11	$0.32

*The additional 0.70 per bottle will only be applied if a recycle incentive is enforced, which has not yet been determined.

[23] "1998 Recycling Rate Targets Set," *Environmental Policy Monthly*, Taiwan EPA, January 1998.

[24] Approximate exchange rate of 0.02879 NT$, as of August 15, 1998. Note NT$ = Taiwan dollars.

plans and progress reports annually. The supplier or importer of the packaged consumer goods will be responsible for paying the recycling fees for the packaging they place on the market. The fees set for 1998 for packaging materials in Taiwan are presented in Exhibit 13.

These rates were calculated based on an assumed 70 percent waste collection rate and will be reviewed by the Fund Management Committees once actual cost data for recycling each material, from the first quarter of 1998, are available.

Proposed Requirements

The new Act allows for the central government to "prohibit or restrict the manufacture, import, or sale of articles, packaging, or containers that may seriously pollute the environment." No specific proposals for such prohibition have been identified to date.

The Taiwan EPA also is proposing a new act that will give environmental protection equal weight with economic development. Under this Act, a clean environment will become a constitutional right for Taiwanese citizens.

The Taiwan EPA is considering adding household appliance polystyrene packaging to covered materials, which would assign responsibility to home appliance manufacturers for reprocessing or recycling waste polystyrene packaging.

Implementation Successes and Obstacles

Taiwan has experimented with Manufacturer's Responsibility for several years. In an effort to alleviate problems that had resulted under its initial attempts, the recent Waste Disposal Act was drafted. According to the Taiwan EPA, "because the old system relied on collection organizations formed by companies themselves, it prevented coordination between the various collection and recycling organizations. This, in turn, led to several problems: target recycling rates were difficult to sustain, recycling rates were difficult to investigate, unfair competition existed, and the collection markets remained closed to wider participation."[25]

To overcome these problems, according to the Taiwan EPA, "EPA has completed a comprehensive plan of the recycling system and has announced related statutes . . . EPA has developed the *Four-in-One Plan for Compensatory Resource Recycling*. With this new plan, the EPA hopes to unite the public, local governments, recyclers, and recycling funds in mutually implementing recycling activities."[26] The Taiwan EPA specified that one of the main obstacles that was blocking the implementation of a successful program was that targets were set higher than available capacity. Because of this, targets were not met and fees had to be repeatedly increased. To compensate for this, EPA established a uniform target rate of 40 percent recycling for all packaging materials and will adjust fees based on attainment or non-attainment of this figure.[27] The following case study may help to highlight the initial obstacles faced in implementing

[25] "A Word from the Bureau of Solid Waste Control," *Environmental Policy Monthly*, November 1997.
[26] *Ibid.*
[27] "1998 Recycling Rate Targets Set," *Environmental Policy Monthly*, January 1998.

Manufacturer's Responsibility in Taiwan and some of the attempts that were made to overcome these obstacles, which ultimately resulted in the current system.

Taiwan PET Bottle Case Study[28]

Manufacturer's Responsibility to recycle was originally written into law in November 1988 through amendments to the Solid Waste Management Act (SWMA). The amendment requires that the manufacturers, importers or dealers of consumer products bear the responsibility of recycling their resulting waste. To implement this law, the Taiwan EPA had to select materials that would be covered and set corresponding recycling rates. In 1990 the Taiwan EPA established a 50 percent recycling standard for PET, under the protest from soft drinks manufacturers. Many lessons were learned from this initial attempt at Manufacturer's Responsibility that have directed the formulation of the new Manufacturer's Responsibility program now under implementation in Taiwan. This section briefly reviews the lessons learned by industry and government under the old system, using PET bottles as an example commodity.

The 50 percent recycling rate was essentially a performance standard that manufacturers, taking into consideration several factors, attempted to achieve with the use of the traditional resource recycling (TRR) system, part of the traditional informal economy in Taiwan. Other relatively more progressive strategies, including a deposit system, were not used due to manufacturers' perceptions regarding their impact on marketing.

In order to meet legal requirements, the Taiwan Soft Drinks Manufacturers Association (Association) set up the Committee on the Management of PET Bottles Recycling Fund (Committee). Partly initiated by the Taiwan EPA, the Association donated NT$5 million ($200,000) and set up the Sifu Foundation, mainly for the purpose of implementing a program using recycling igloos. In addition, two of the largest manufacturers also set up Taiwan Recovery Co. (TRC) for the treatment and reuse of the recycled PET bottles.

The program achieved a 33.5 percent recycling rate in the first year and a 26.1 percent recycling rate in the second year. Based on this failure to reach the 50 percent standard, and the diminishing success of the program in the second year, the adopted system was considered a failure in the eyes of most of the environmental groups and EPA officials. While challenging the basis of the 50 percent recycling rate, the Association admitted something went wrong with the existing system. The following factors were widely believed to have contributed to the poor performance of the system:

- The TRR system was closed, i.e., industry-controlled with a tendency to the creation of recycling monopolies;
- The TRR system covered only a limited number of areas with too few recycling points;
- The incentive to recycle was too low; and
- The Association provided insufficient coordination and supervision.

[28] The discussion in this case study is adapted from Jiunn-rong Yeh, National Taiwan University. "Searching for a Better Combination of Command-and-Control and Economic Incentive: Resources Recycling Policy in Taiwan." *Proceedings of an Invitational Expert Seminar*, Trolleholm Castle, Sweden, 4-5 May 1992.

The Association , in reviewing the TRR igloo strategy, strongly confirmed its educational achievements, but admits the following deficiencies:

- The igloos were perhaps too large and, given the constraints imposed by Taiwan's high population density and consequent space constraints, were not well placed; and
- Local knowledge of proper sortation requirements was not mature enough to support the system, resulting in excessive contamination of the materials collected.

After approximately two years of operation, the once active igloo campaign essentially ceased to operate.

Following Taiwan's failure to meet the required recycling rate, the Authority, according to the law, imposed fines and ordered the submission of compliance plans detailing how the required standard would be achieved. Dissatisfied with the system, environmental groups called for tougher measures, including issuing cease to operate orders and mandatory deposits. The Authority, however, remained ambivalent toward the policy change.

In the meantime, a strong environmental advocate was appointed to head the Taiwan EPA. With the changeover of administration, EPA moved toward mandatory deposits. The new Administrator declared that mandatory deposits and widespread installation of buy-back centers are critical elements to success. This view was supported by the fact that the existing deposit system adopted by the Taiwan Tobacco and Wine Monopoly Co. achieved a recycling rate of more than 90 percent over the same period. The Association accepted the advice from the Taiwan EPA and began to work on the details, including negotiating with supermarkets and convenience store chains for the takeback program. Finally, the deposit system began to operate on March 16, 1992.

The new system encompasses 10,600 PET bottle buy-back centers and 24 contracting working stations. Each beverage sold in a PET container is charged a deposit fee of NT$2 (US$0.04). Upon the return of the bottle to any buy-back center, the consumer receives the same amount as a refund. The buy-back centers then forward the PET bottles to any of the 24 working stations and get NT$2.5 (US$0.05) per bottle.

During the first two months of this system, the recycling rate increased 4.25 times over that of the same period in the previous year. Surprisingly, rural areas worked much better than urban areas. The deposit system itself is a strategy that relies heavily on economic incentives. But the regulatory requirement to use this strategy is command-and-control in nature. Although the Authority has, so far, survived the legal challenges, it has been perceived that the arbitrary setting of the recycling rate may still be a source of problems because neither industry nor environmental groups are content with the results, especially when the targets are not met.

Impact on Manufacturers

The Taiwan program was selected for this study because of its unique focus on waste prevention and market-driven recycling approaches. Because the program is still new, at this time, no data are available regarding the impact of the Taiwan program on manufacturers.

Summary

Taiwan has experimented with several phases of Manufacturer's Responsibility and found that in its cultural and political context, the role of Third Party Organizations is best played by government entities. Taiwan also has found that setting high recycling goals is not the answer to increasing recycling. Instead, Taiwan has taken a more market-driven approach, using fees rather than quotas. In addition, Taiwan is taking an ambitious market-based step to close the recycling loop, by requiring that government purchases give preference to environmentally preferable products.

V. Potential to Capitalize on Foreign Manufacturer's Responsibility Programs in the U.S.

This section of this paper takes the information provided in the previous discussion of Manufacturer's Responsibility programs in Belgium, Germany, Taiwan and the U.K. and considers what lessons the U.S. can learn from these programs and what options are available to the U.S. to reduce the overall quantity of packaging waste generated in the U.S. and increase the recycling of these materials, without actually enacting Manufacturer's Responsibility legislation in the U.S.

Overview of Foreign Programs

This paper presents a review of the concept of Manufacturer's Responsibility and presents case studies of Manufacturer's Responsibility legislation in four different countries. Each of these countries has taken a different approach to decreasing the quantity of packaging discarded and to funding recycling of packaging waste. All four countries reviewed are similar to the U.S. in their general level of industrialization and economic development, but differ notably in size and governmental centralization, and differ culturally in many ways.

Of the four countries, Belgium perhaps has taken the most proactive steps to reduce waste by requiring that manufacturers prepare waste prevention plans. Taiwan appears to be following suit, and also requires that manufacturers record their use of virgin and recycled materials, while attempting to apply a market-driven fee structure.

The United Kingdom has taken the most comprehensive approach to allocating costs for waste management by adopting a system of shared responsibility that extends the obligation for funding of recycling programs, using a specific formula, to the manufacturer, packer, wholesaler and suppliers. Most other Manufacturer's Responsibility programs tend to place the responsibility more squarely on manufacturers or importers. The U.K. system is designed to be more equitable, but also may result in a more decentralized and perhaps confusing system. Finally, Germany offers the prototype Manufacturer's Responsibility program and offers, through its initial pitfalls to its increasing success, many lessons about how a program should be designed if it is to be successful.

All of the countries have set specific targets for recycling, although Taiwan has purposely set low targets to allow the markets time to adjust, while the other three countries have established higher targets in an attempt to pull the markets by creating supply. The three European

countries have allowed for the creation of industry organizations, or Third Party Organizations, to meet the recycling obligations. In Germany, Belgium and the U.K., a Third Party Organization is responsible for establishing fees to fund the collection and recycling infrastructure. Fees in Taiwan are set by the government. The responsible parties in Taiwan are not industry organizations, but rather non-profit organizations established by the Taiwan EPA to set fees and oversee the creation of the recycling infrastructure.

Finally, all of the countries reviewed apply fees to materials based on their recyclability and available recycling infrastructure. Higher fees, essentially penalties, are generally set for materials for which adequate recycling infrastructure does not exist. Generally, lower recovery targets are established for these materials. Similarly, higher fees are set for materials, such as composites (*e.g.*, laminated paperboard), that are technically difficult to recycle.

The countries that have taken the lead in implementing the EU Packaging Directive and Manufacturer's Responsibility programs have helped to illuminate many useful lessons. A Dutch Third Party Organization, Stichting Verpakking en Milieu (SVM),[29] has summarized many of these lessons. While these are open to debate, many of the organization's comments are worthy of consideration prior to turning to what we can do in the U.S. Many of the points raised by SVM are particularly relevant when considering the U.S., given that the U.S. will not likely implement full Manufacturer's Responsibility legislation, but may instead have to rely on partnerships with industry organizations or industry-sponsored initiatives. In its review, SVM suggests the following:[30]

- There is a wide gap between being right and getting the rest of society to understand that you are right.
- Protecting the purchasing power of the consumer is an important criterion for trade and industry when it comes to choosing from alternative environmental measures.
- The stricter a country's environmental policy, compared to other countries, the more important it is for responsibility to be shared rather than borne in its entirety by the producers alone. This will help maintain the balance of economy and ecology without disrupting a country's trade and industry.
- A policy of realistic environmental targets, shared responsibility, market conformity, protection of purchasing power, and stimulation of cost-effective measures seems to be able to replace the need for eco-taxes and levies.
- Consumers expect producers to solve the environmental problem without compromising the performance and user-friendliness of their products or significantly altering their price.
- A waste policy for packaging material flows should be integrated into the overall national waste policy for flows of material of the same kind.
- Basic premises and underlying principles are needed when launching new policies, yet the implementation of such policies must be based on a customized approach.

[29] Since the publication of this article, Stichting Verpakking en Milieu (SVM) has changed its name to SVM-PACT.

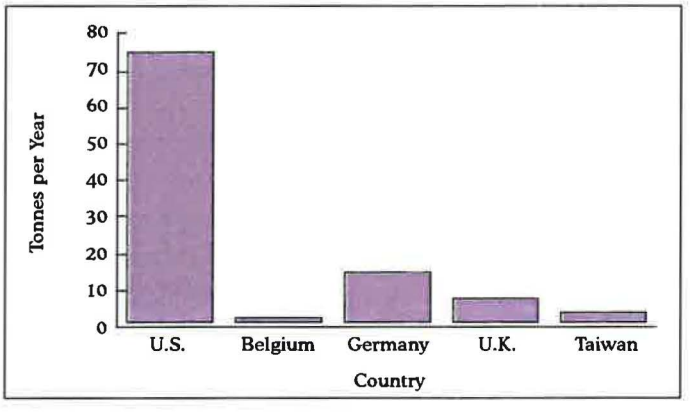
[30] Stichting Verpakking en Milieu, *A Major Challenge: Effective environmental measures without unnecessary loss of consumer purchasing power*, October 1995, pp. 64-65.

- The development of new technology for handling waste in households and on the street, for applying logistical aids in waste removal, for mechanically sorting waste, and for recovering energy from high calorific waste, etc., can be a profitable spinoff for authorities because of their involvement in waste disposal.
- The effectiveness and efficiency of an environmental policy for packaging begins at the drawing board with "design for prevention" and "design for recycling."
- The responsibility for organizing an intensive public information campaign aimed at discarders of used packaging must be shared by the government and the packaging chain.
- The packaging chain should take full responsibility for: 1) ensuring a more economic use of raw materials and energy in the manufacture of packaging; 2) selecting materials, substances, and additives for packaging that will cause the least damage to the environment; and 3) recovering raw materials from economically recyclable packaging waste.

The U.S. in Comparison

The U.S. is a country of approximately 270 million people, compared to an average population of 43.8 million for the other countries looked at in this analysis. For the purposes of waste management, it's even more striking to note that the total area of Belgium, Germany, Taiwan and the U.K., combined, is equal to less than seven percent of the total land area of the U.S. Perhaps the most striking comparison between the U.S. and the other four countries is the difference in population density. The U.S. has a population density of approximately 28 people per square kilometer, while Germany and the U.K. have more than 200 people per square kilometer, Belgium has more than 300 people per square kilometer and Taiwan has more than 600 people per square kilometer. Obviously the need to identify alternatives to landfilling, and also to incineration, in these countries is much more pressing than in the U.S.

Exhibit 14: Total Packaging Waste Generation, by Country



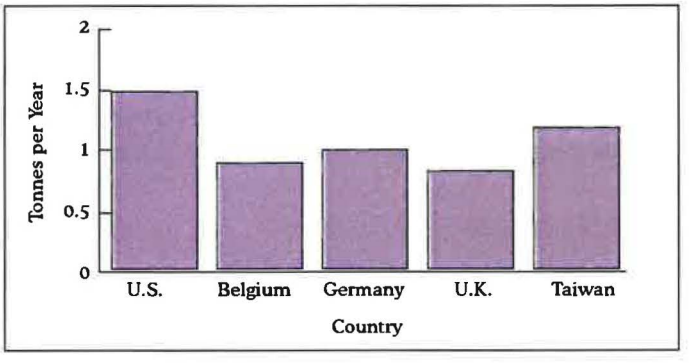
Primarily because of its size and population, the U.S. generates approximately 210 million tons per year of municipal solid waste, approximately 75 million tons of which is packaging waste. Packaging waste generation in the U.S. equates to approximately 1.5 pounds per person per day. In comparison, Belgium generates approximately 1.6 million tonnes per year of packaging waste, or approximately 0.9 pounds per person per day; Germany generates substantially more with 15 million tonnes per year, or approximately 1.0 pounds per person per day; the U.K. generates 8 million tons of packaging waste each year, or approximately 0.85 pounds per person per day; and Taiwan generates approximately 4.35 million tons of packaging waste each

year, or approximately 1.2 pounds per person per day. Total and per capita waste generation figures are shown in Exhibits 14 and 15.

The U.S. generates substantially more packaging waste than the other countries examined in this paper, and likely more than any other country in the world, on both a total and per capita basis. The U.S., however, has taken a notably different approach to waste prevention and recycling than those being implemented in Europe in response to the European Packaging Directive. The U.S. has done very little in the way of establishing mandates, other than states setting recycling goals. Most of the burden of management of packaging waste generated by consumers has been borne by municipal governments, as was the case in Europe prior to the adoption of the packaging regulations and the development of Third Party Organizations. Development of recycling infrastructure and capacity has been left almost exclusively to the market, with only limited input from the Federal and state governments in terms of tax rebates, grants, and technical assistance. The question arises, do the U.S.'s current efforts compare to Belgium, Germany, Taiwan and the U.K. during the time period in which Manufacturer's Responsibility programs were being implemented in those countries.

In terms of overall recycling, the U.S. EPA reports that in 1995 the U.S. recycled approximately 27 percent of the total quantity of municipal solid waste generated; Germany recycled approximately 17 percent of total MSW; and the U.K. recycled only approximately three percent of its total MSW generation. Exact figures are not available for Taiwan, but it is estimated that Taiwan currently recycles approximately 15 percent of its total MSW stream.

Exhibit 15. Per Capita Waste Generation by Country



However, if one considers performance on a material specific basis, some of the other countries fare better than the U.S. In 1995, the U.S. recycled approximately 31 percent of glass beverage containers, while Belgium recycled approximately 70 percent, Germany recycled approximately 85 percent, and the U.K. recycled just less than 25 percent. Similarly, during the same period, the U.S. recycled only 58 percent of the total paperboard generated, while Belgium recycled 80 percent and Germany recycled 94 percent. For total plastics used in packaging, the U.S. recycled a mere 1.8 percent, while Belgium recycled approximately 16 percent and Germany recycled an astonishing 68 percent. Similar figures are not available for the U.K. or Taiwan because their programs have only recently begun operation. It can be assumed that the overall recycling rate in the U.S. is higher than in the other countries because although the European countries may have focused on consumer packaging, the full range of recycling is not yet as fully developed as in the U.S. and the prevalence of curbside recycling programs in the U.S. has dramatically increased recycling rates for certain household wastes.

Another important measure to consider is waste prevention. The primary goal of Manufacturer's Responsibility programs is to provide an incentive to reduce the quantity of

waste generated, and then to fund the environmentally sound management of waste that is generated. Solid waste generation continues to increase in the U.S. In 1995, the U.S. generated approximately 208 million tons of municipal solid waste and, according to U.S. EPA figures, this is expected to rise to approximately 221 million tons by 2000. However, during this period, per capita generation is expected to remain steady at around 4.4 pounds per person (all MSW, including packaging waste), and recycling is expected to increase to 30 percent, so that the net disposal rate will increase at a lesser rate. Based on the case studies in this paper, it appears that, while the U.S. appears to be on the right track, holding per capita generation steady, Europe may be experiencing more real success in actually reducing the quantity of waste generated. For example, Michele Raymond recently reported that in Germany, all types of packaging declined: tinplate declined 17 percent, paper declined 5.8 percent; aluminum declined 21 percent and plastic declined 4 percent. In comparison, in the U.S., data prepared by Franklin Associates, Inc. show that use of all types of materials increased from 1991 to 1995, except steel. Packaging papers/board grew 15.7% and wood (mostly pallets) grew 34%."[31]

Manufacturers in Europe appear to be making real strides toward reducing the quantity of materials used in packaging and, through the efforts of the Third Party Organizations and government environmental agencies, these innovations are being recognized and transferred from one company to another. Many of the changes can be tied to the packaging taxes, which would have to be paid if the packaging were not modified or changed. DSD in Germany has instituted the "Innovation Prize for Packaging," an annual competition to recognize "ecologically optimized and economically advantageous packaging solutions." The Ministry of Environment in France recently published its *Catalogue for the Prevention of Packaging Waste*. This catalogue, which presents real examples of source reduced packaging on the market, states as its goals:

- to establish credibility of packaging waste prevention, using concrete and conclusive examples, and
- to launch an objective debate on the subject and create the conditions for developing that debate by providing players with as much information as possible on both the possibilities and the limitations of this particular approach.

As discussed earlier in reference to Belgium, one of Belgium's Third Party Organizations, FOST Plus, also has implemented a packaging waste prevention program and has published the results of its efforts in the December 1997 publication, *As Little As Possible, As Much As Necessary*. This publication presents a range of examples of source reduction opportunities, including lightweighting and moving toward more recyclable materials.

Based on initial results from Belgium and the waste prevention success in Germany, it appears that these efforts are having some impact on the overall quantity of waste generated in each country and, perhaps more importantly, on consumer attitudes toward packaging. The U.S. has placed source reduction at the top of its waste management hierarchy, and source reduction has no doubt received attention in the U.S., but it has not yet achieved the same stature as it appears to have in countries that have adopted Manufacturer's Responsibility programs.

[31] Raymond Communications, Inc. "German Packaging Ordinance Still Haunts Industry," May 3, 1998.

Some industry experts have expressed a belief that Manufacturer's Responsibility may someday make its way to the U.S., but it is not likely that this will happen soon, and there are many proactive steps that manufacturers in the U.S.; Federal, state and local governments; industry associations; and advocacy groups could take together to help to reduce the quantity of packaging waste generated and to increase recycling of materials that are produced. The next section addresses these options in detail.

Options for the U.S.

Manufacturer's Responsibility is likely to continue to grow as a force influencing the manner in which the world manages its waste. U.S. companies exporting to Europe, Asia and Latin America will be affected by these regulations. U.S. companies engaged in global commerce are or will in the future be required to pay fees on their primary packaging, secondary, and/or tertiary packaging or report to and reimburse importers and other responsible entities for the fees they pay. In addition, if U.S. companies have manufacturing operations in certain countries, they may have to prepare and implement waste prevention plans.

Innovative planning may enable U.S. environmental authorities to leverage legislation passed in other countries to influence the quantity and recyclability of packaging waste generated in the U.S. Policy makers also can work to enhance the efficiency of our current collection and recycling infrastructure through creative partnerships with industry and by drawing from the lessons learned abroad. The experiences of other countries can be adapted to support the development of programs that work within the context of the U.S. cultural and political framework to reduce packaging waste and to increase recycling. This section presents some of the options available to the U.S. An overview of these options is presented in Exhibit 16.

Increase Industry Awareness of International Packaging Requirements and Encourage Globalization of Packaging

U.S. companies are continuing to enter the global market at a rapid pace and globalization of packaging has been identified as a top priority among packaging developers. A recent survey conducted by *Packaging World* found that when packagers were asked to select one from a list of 10 trends that they believe will have the greatest impact on packaging in the coming years, the most popular answer was "consolidation/globalization." *Packaging World* points out further that "as growth in established markets slows, suppliers will increasingly look for growth in emerging international markets."[32]

U.S. businesses can respond to the accelerated emergence of environmental packaging taxes, and their exposure to these taxes as they enter new markets, in several ways; they can pay fees on their packaging as is; they can reduce their packaging to reduce associated fees; and/or they can change the materials used for packaging to materials with lower fees (*e.g.*, change from laminated paperboard to coated paperboard). Given the increasing globalization of U.S. enterprises, the most sensible approach for a given company may be to develop the most cost-effective packaging strategy, in terms of minimizing environmental packaging taxes, that still

[32] Newcorn, David, Senior Editor. "Packagers predict future trends." *Packaging World*. August 1998.

meets performance standards, and introduce the resulting packaging into the global market, including the U.S.

Unfortunately, U.S. companies' understanding of global environmental packaging regulations is limited and most U.S. companies are likely to be slow in their response to the regulations. Companies may take years to begin to appreciate fully their potential options and to develop an approach such as globalization of packaging. This assumption is not to discredit companies already on this path, but is offered in recognition of the fact that most of the exporters in the U.S., large and small, simply do not consider environmental packaging to be one of their priorities, given all of the other demands on time and resources posed by manufacturing, exporting, and marketing.[33]

To help increase the slope of the learning curve, the U.S. can assess opportunities to raise awareness among U.S. exporters, highlighting the importance of international packaging regulations and requirements and their potential impact on a company's ability to continue to play a role in the global market. The U.S. can pursue opportunities to work with U.S.-based companies to explain the cost of complying with the regulations (and the cost of not complying), and identify options available to companies to reduce their costs. The states or the Federal government can take the lead in this process, or they can coordinate with trade associations, not-for-profit groups, and private firms to promote increased awareness.

Trade associations may offer the most promising avenue for outreach, given their direct ties to the affected parties and the opportunities for hosting events in conjunction with scheduled association meetings and trade shows.

Regardless of who takes the lead, U.S. companies' ability to optimize their competitive position in the global market will be enhanced by their improved understanding of environmental packaging requirements. U.S. companies will benefit from access to information on numerous issues, including: specific reporting requirements; types of packaging subject to requirements; materials subject to fees and associated fee schedules; and specific approaches they can take to reduce fees, including source reduction, lightweighting, changing to alternative materials, and creating standard packaging for global distribution.

Encourage a Unified Approach by Industry

The European experience with Manufacturer's Responsibility has highlighted the impact industry can have when it unifies to address the issue of packaging and packaging waste. Industry associations, such as the Institute of Packaging Professionals and the American Plastics Council, could work together to learn from Europe and develop a united approach to reducing packaging waste in the U.S. Reduction efforts could be targeted through the entire process from material selection and design, through manufacturing, to collection, and ultimately to recycling. Without a unified approach on the part of industry, a fragmented system will result, as is the case at present.

[33] The observations made in this paragraph are based on interviews and discussions by SAIC over the past two years with several major U.S. manufacturers in the course of this project and related research.

Some efforts already are under way along these lines. For example, the Association of Postconsumer Plastic Recyclers has worked in conjunction with a variety of plastic manufacturers and recyclers, including Proctor & Gamble, Wellman, Union Carbide Corp., and Occidental Chemical Corp., to develop and publish a report entitled *Design Guidelines for Plastic Bottle Recycling*. Similarly, the National Association for PET Container Resources (NAPCOR) was formed by industry to "provide technical and educational information, market expertise and promotional support for PET plastics recycling programs nationwide." NAPCOR can claim some success in that, according to information provided by NAPCOR, in 1996, more that 27 million homes in more than 7,000 communities included PET plastic containers in their curbside recycling programs, and 572 million pounds of PET plastic were recycled — approximately 26 percent of all PET containers produced, and nearly triple the amount recycled in 1990.

The U.S. could look to expand these approaches and encourage a broader range of unified industry initiatives to address source reduction and recycling of consumer packaging. One model to consider is the Dutch experience with Packaging Covenants. Industry in the Netherlands elected to take a voluntary "target group approach" to institutionalizing packaging reduction measures because previous command-and-control environmental approaches had not been as successful as hoped. The Dutch Packaging Covenant of 1991 targeted 12 sectors for deliberation and design of applicable product-related or process-related covenant terms. The strategy employed life cycle analyses (LCA) and related market-economic analyses (MEA) to refine strategies for waste reduction and to provide data and context to select among options for program requirements. Packaging waste prevention and reuse targets were established for 2000, based on a reference year of 1996 for glass, paper and cardboard, plastic containers, and foils. Specific goals were developed by each of the target sectors based on the results of the LCAs and MEAs. Membership was voluntary, but the 10-year voluntary agreement was enforceable by civil law for those who subscribed. The key, perhaps, to the Dutch Covenant was that it recognized "chain responsibility," linking companies along the product chain, including manufacturers and government entities. In response to the European Directive, a new covenant, referred to as Covenant II, is being implemented in the Netherlands. Covenant II contains mandatory requirements and includes all companies in the packaging chain, rather than just the 400 companies that signed the original covenant.

While the Netherlands' voluntary agreement is being codified, Australia is in the process of developing a voluntary Packaging Covenant. The Covenant is a voluntary agreement aimed at improving the recovery, re-use and recycling of used domestic consumer packaging materials in Australia, and incorporates the principles of product stewardship and shared responsibility. Its expressed aims are to establish a framework for effective life cycle management of packaging and paper products and to establish a collaborative approach between the various levels of government and industry.

Exhibit 16: Summary of Recommendations for the U.S.

- ✔ Increase Industry Awareness of International Packaging Requirements and Encourage Globalization of Packaging through Coordination with Industry Associations
- ✔ Encourage a Unified Approach by Industry for Waste Prevention and Recycling
- ✔ Initiate a High-Profile Environmental Packaging Award
- ✔ Develop Preferred Packaging Guidelines Based on EC "Essential Requirements"
- ✔ The Preferred Packaging Guidelines to Eco-Label Programs
- ✔ Gather Industry Packaging Data
- ✔ Establish Technical Assistance Program for Waste Prevention and Recycling
- ✔ Encourage Industry-Sponsored Manufacturer's Responsibility
- ✔ Develop Environmentally Preferable Product Purchasing Guidelines for Government and Corporate Purchasing Programs

Initiate a High Profile Environmental Packaging Award

As part of a unified approach to highlighting opportunities to source reduce and increase the recyclability of packaging, industry could implement an Environmental Packaging Award Program. Several European countries have initiated award programs for innovations that improve the ecological and economic design of packaging, such as the U.K.'s Packaging and Environment Packaging Innovation Awards and the Norwegian Design Council's Award for Good Design. Many U.S. packaging associations and publications recognize new advances in packaging, such as *Packaging World* and the Institute of Packaging Professionals. In connection with a major packaging trade show, such as Pack Expo, the largest packaging trade show in the U.S. each year, these organizations could sponsor an award for outstanding environmental packaging and publicize the award at the conference and in the form of a publication, such as those prepared by European Third Party Organizations. In the early 1990s, the Coalition of Northeast Governors implemented a packaging source reduction program and published the results of participating companies. This tradition could be revived and expanded in the U.S.

Develop Preferred Packaging Guidelines Based on EC "Essential Requirements"

The 1994 Directive on Packaging and Packaging Waste contained an appendix outlining the "Essential requirements on the composition and the reuse and recoverable (including recyclable) nature of packaging." These are:

Requirements specific to the manufacturing and composition of packaging:

- Packaging shall be manufactured so that the packaging volume and weight are limited to the minimum adequate amount to maintain the necessary level of safety, hygiene and acceptance for the packaged product and for the consumer.
- Packaging shall be designed, produced and commercialized in such a way as to permit its reuse or recovery, including recycling, and to minimize its impact on the environment when packaging waste or residues from packaging waste management operations are disposed.
- Packaging shall be manufactured so that the presence of noxious and other hazardous substances and materials as constituents of the packaging material or of any of the packaging components is minimized with regard to their presence in emissions, ash or leachate when packaging or residues from management operations or packaging waste are incinerated or landfilled.

Requirements specific to the reusable nature of packaging:

- The physical properties and characteristics of the packaging shall enable a number of trips or rotations in normally predictable conditions of use.
- Processing must meet health and safety requirements for the workforce.
- Packaging must be recoverable when it is no longer reusable and thus becomes waste.

Requirements specific to the recoverable nature of packaging:

- Packaging recoverable in the form of material recycling must be manufactured to enable the recycling of a certain percentage by weight of the materials used, in compliance with current standards of the European Community. The establishment of this percentage may vary, depending on the type of material.
- Packaging recoverable in the form of energy recovery shall have a minimum inferior calorific value to allow optimization of energy recovery.
- Packaging recoverable in the form of composting shall be of such a biodegradable nature that it should not hinder the separate collection and the subsequent composting process.
- Biodegradable packaging waste shall be of such a nature that it is capable of undergoing physical, chemical, thermal or biological decomposition, such that most of the finished compost ultimately decomposes into carbon dioxide, biomass and water.

The EC is required to take these general requirements and promulgate actual standards based on them. Packaging that does not conform to the standards will not be allowed on the European market. The European Committee for Standardization (CEN) has developed a set of draft standards. Final standards are expected to be issued in July 1999.[34] The draft standards will provide manufacturers and users of packaging with a procedure for including environmental considerations in their packaging design decisions and for ensuring that their packaging is as environmentally preferable as possible. When final, the standards also will provide consistency across Europe, so that a package that is considered to be in compliance in one EU country will be in compliance in all EU countries.[35] The draft standards contain the following provisions:

- *Source reduction* - Companies would develop a list of the functions that each of its packages is supposed to perform, such as product protection or marketing. The company then would determine which functions are critical and whether the package can be further reduced without negative impacts.
- *Recyclability* - For a package intended to be recycled, a company would determine the type of recycling technology needed to recycle the package and whether that particular capability exists somewhere in Europe.
- *Reusability* - For a reusable package, the manufacturer would ascertain whether the package is intended to be reused and whether it can be viably emptied or unloaded, reconditioned and refilled or reloaded, and whether the appropriate collection system exists.
- *Recordkeeping* - For each package type, the manufacturer would have to prepare a summary of assessment results and then retain these for at least two years after a package is placed on the market. These reports would have to be available for examination upon request.

[34] Personal communication: Mara Cherkasky, Thompson Publishing, with Jacques Fonteyne, European Recycling and Recovery Association, May 14, 1998.

[35] "European Standards Help Companies Assess Package 'Greenness'," *Environmental Packaging*, August 1998.

In the U.S., the Federal government or national not-for-profit organization(s), in consultation with relevant trade and packaging organizations, could adapt the standards developed by the EC to create voluntary Preferred Packaging Guidelines in the U.S. In 1991, the Coalition of Northeast Governors' (CONEG) Source Reduction Task Force developed a set of preferred packaging guidelines and issued a challenge to the top 200 users of packaging in the U.S. to adopt these guidelines. Thirty-four of the 200 companies responded. The general concepts behind the packaging guidelines were simple: no packaging, minimal packaging, returnable/refillable/reusable packaging, and recyclable/recycled content packaging. More detailed guidance regarding weight to volume ratios also were provided, but were generally overlooked by policy makers. CONEG also developed Model Packaging Legislation that would have set specific source reduction requirements in states that adopted the legislation. The legislation was proposed in several states, but never adopted.

During the same time period, the Institute of Packaging Professionals (IoPP) issued its *Packaging Reduction, Recycling, and Disposal Guidelines*. The intent of these guidelines is to "help companies consider environmental implications during the package structure design process" without formulas "to judge how 'environmentally friendly' a package is. Rather, questions are presented to help packaging professionals address environmental considerations as related to their particular packaging situations." Australia recently drafted a voluntary Packaging Covenant that also includes an *Environmental Code of Practice for Packaging: An Industry Self- Regulatory Code of Practice* that is based in large part on the IoPP guidelines.

These efforts to promote preferred packaging guidelines were important steps in increasing industry and consumer awareness of source reduced packaging options. U.S. industry could go the next step, however, and develop more aggressive guidelines, based on previous U.S. models and the European essential requirements, that incorporated specific goals and guidelines for packaging to be recognized as "source reduced" or "environmentally preferable."

Tie Preferred Packaging Guidelines to Eco-Label Program

An eco label could be tied to the packaging guidelines to increase consumer awareness of source reduced packaging or packaging that met other guidelines. Companies that market packaging that complies with the Preferred Packaging Guidelines could be allowed to display an eco-label on their packaging. Such a program could possibly be run in conjunction with Green Seal, a not-for-profit organization in the U.S. that sets standards for environmentally responsible products to reduce air and water pollution; cut the waste of energy and natural resources; slow ozone depletion and the risk of global warming; prevent toxic contamination; and protect fish and wildlife and their habitats. Green Seal was slow to gain attention, but has been gradually increasing its involvement with major corporations.

Developing Preferred Packaging Guidelines in conjunction with industry associations and an existing eco-label organization, using the lessons learned in Europe, offers a promising avenue to increase the use of environmentally preferable packaging and to increase consumer awareness of such packaging.

Gather Industry Packaging Data

One of the most beneficial aspects of the Manufacturer's Responsibility programs in Europe and Asia has been the focus that has been placed on recordkeeping. Manufacturers and other interested parties now have a much better grasp of the quantity of and types of packaging that they place on the market, which appears to have helped focus resources on source reduction and increased recyclability. Similarly, in the U.S. we have the Toxics Release Inventory, which has been credited with increasing industry awareness of releases of toxic chemicals to land, air and water. The U.S. could adopt a voluntary packaging inventory program, where major users of packaging would publicize the type and quantity of packaging they place on the market and how much of this is recycled. Such programs are already in place through certain trade associations, such as NAPCOR, and general data is published by EPA in its annual *Characterization of Municipal Solid Waste* report. Development and publication of a focused database, however, that catalogues the quantity and type of packaging, by industry, placed on the market, may serve to better organize and publish these data, and to focus manufacturers' attention on potential avenues for source reduction.

Establish a Packaging Technical Assistance Program

The U.S. EPA has been successful with its voluntary technical assistance programs, such as Green Lights and WasteWi$e. Applying the lessons learned in Europe and Asia, the Federal government and/or national environmental advocacy organizations, and/or industry associations could develop a similar technical assistance program for packaging. The program could have three points of focus: packaging design, packaging collection and packaging recycling.

Because of the collection and recycling targets established in countries with Manufacturer's Responsibility programs, packaging design, recovery, and recycling all have taken significant leaps forward. A technical assistance program could work to highlight advances made in the U.S. and lessons learned from Europe and Asia to bring these technologies to the marketplace in the U.S. Japan has been working in conjunction with Germany to import German collection, recovery and recycling technology. The U.S. could benefit from pursuing similar action. Such a program could be run in conjunction with an industry association such as the Institute for Packaging Professionals or the Grocery Manufacturers Association and draw on their resources and experience to work with companies in the U.S. to modify their packaging designs to meet certain environmental goals.

Encourage Industry-Sponsored Manufacturer's Responsibility

Increasing awareness of international packaging regulations and then relying on the market to make adjustments likely will have some impact on packaging generation in the U.S., but the actual impact is difficult to gauge. Resulting trends may favor reduction in the overall quantity of material generated while increasing the general recyclability of packaging materials. However, these trends are unlikely to result in a major change in the collection and recycling infrastructure, which is a central goal of many of the regulations enacted in many countries. Several more aggressive options are available to U.S. policy makers that may impact source reduction as well as recycling.

Manufacturer's Responsibility is going to be a driving force worldwide. While the U.S. is not anticipated to adopt such a program in the near term, such a course is not out of the question, especially as international acceptance increases and programs are refined and show success. The complexity and diversity of the U.S. culture and market, however, make it unlikely that a system on the scale of the German DSD system would be cost-effective here, but a modified system could be considered, especially if industry were to take the lead. Moreover, an industry-sponsored, modified system might appear attractive to industry in lieu of the possibility of a Federally mandated, comprehensive Manufacturer's Responsibility program.

A modified system could assume many forms. For example, a fee placed on materials with "low" recycling rates could be used by industry associations to fund recycling research. The fee could be removed once a predetermined level of recycling had been achieved. Another option would be to place a fee on certain types of packaging to help fund the development of a collection and recycling infrastructure in areas where market solutions have not been as successful, such as in parts of the Rocky Mountain region. Whatever form the system takes, ultimately it will require a compromise with industry to help push recycling of hard to recycle materials and to spur recycling in general. Similarly, a modified system could be used to drive source reduction and packaging innovation.

Develop Environmentally Preferable Product Purchasing Guidelines for Government and Corporate Purchasing Programs

The U.S. EPA has issued Comprehensive Procurement Guidelines for a broad range of products typically purchased by the Federal and state governments, ranging from paper to tires. These Guidelines could be adopted at the state and city level and made more stringent, *i.e.*, provide actual preferences to recovered-content or source-reduced products. Many major corporations in the U.S. have immense purchasing power and by themselves or in conjunction with other corporations in their industry also could adopt Environmentally Preferable Product Purchasing Guidelines to help strengthen markets for products made from recovered materials that in many cases may have been generated by these corporations in the first place.

VI. Conclusion

The emergence of Manufacturer's Responsibility programs is a recent development and one to which manufacturers, importers and consumers are only beginning to adjust. Nevertheless, these programs have already inspired a major change in people's perceptions of waste and resources. As U.S. business leaders work with foreign governments to inventory the packaging they introduce into commerce, calculate their obligation and contemplate strategies to reduce their packaging waste and fees, U.S. regulators have an opportunity to observe industry and consumer response to a variety of aspects of the different countries' programs.

In preparing this paper, we reviewed numerous journal articles and conference presentations, and held discussions with manufacturers and consumers of products and packaging distributed in many of the countries where Manufacturer's Responsibility programs are in force. In addition, we talked to representatives of Third Party Organizations in almost every country in

which they are operating. Based on this research, we have prepared the following preliminary observations that may help to guide further discussion in the U.S. regarding packaging waste prevention and recycling.

- The requirement that businesses inventory and report on their packaging raises their level of environmental awareness. In many cases the implementation of environmental packaging programs marks the first time manufacturers have considered the sheer volume of waste they generate and the environmental and economic consequences of their packaging.
- Programs that require inventorying and reporting provide a reference point against which businesses can monitor their performance and their progress in reducing packaging waste. Establishing a baseline and measuring progress from this baseline generally creates a promising basis for behavioral change. If waste is measured, intuitively, the likelihood of implementation of waste reduction strategies appears to increase.
- Manufacturer's Responsibility programs promote life cycle awareness among businesses and consumers and serve to drive higher environmental standards in product development.
- Manufacturer's Responsibility programs can influence packaging material selection to encourage the use of easily recovered, reusable, and recyclable materials and to discourage the selection of materials that are difficult to recycle.
- Manufacturer's Responsibility programs can define new and productive relationships between diverse businesses (product manufacturers and packaging manufacturers; importers and local material handlers) and new relationships with local authorities.
- Efforts at cost avoidance can drive environmental packaging innovation and waste reduction.
- Manufacturer's Responsibility programs introduce a new measure of industrial competitiveness related to life cycle efficiencies.
- Programs that emphasize life cycle costs can encourage consumer support for less wasteful products simply through price competition.
- Programs to recognize achievements in packaging innovation, such the U.K.'s Packaging and Environment Packaging Innovation Awards and the Norwegian Design Council's Award for Good Design, can promote further research and innovation that result in packaging waste reduction.
- Manufacturer's Responsibility programs can serve to promote innovation by targeting program fees specifically for research and development.
- Programs promoting the establishment of Third Party Organizations can create opportunities for the development of new waste management businesses working to achieve specified environmental goals. These businesses, because they are government-approved, industry-sponsored organizations, often enjoy a distinct market advantage. In theory, they operate essentially as cooperatives. Owing to their

size and sphere of influence, such organizations can leverage their position to achieve waste management economies and efficiencies.

- The proliferation of country-specific environmental packaging programs, each with its own set of provisions, priorities, reporting demands and schedules has created a complex net of regulatory requirements significantly complicating compliance efforts of businesses with extensive distribution networks. While the fundamental theme of all of the programs is the same, the manner of accounting and program implementation, country to country, is so varied that it may threaten to erode the overall global credibility of the Manufacturer's Responsibility trend. The same holds true in the U.S., where different states are developing different packaging, recycling, and recycled-content requirements.
- The provision of tradable credits, such as those indicated by the U.K.'s Packaging Recovery Notes, has the potential to enhance program flexibility for the regulated community as well as to reinforce the image of packaging materials as resources, thus giving value to commodities previously considered waste.
- The pervasive presence of Manufacturer's Responsibility within a country or a society enhances public awareness of waste management costs and fuels support for waste prevention and an enhanced national environmental awareness. The periodic publication of reports concerning national progress toward recycling and recovery goals can also fuel public awareness and support for progressive environmental programs.

U.S. businesses are subject to the emerging revolution in industrial and environmental economics. As various countries endeavor to create programs that produce the desired environmental outcome within a productive and stable economic framework, U.S. policy makers can capitalize on the various countries' strategies to work with industry to reduce packaging waste in the U.S. before committing to any mandated course of action relative to Manufacturer's Responsibility.

Minimum Content Standards

I. Overview of Minimum Content Standards (MCS)

This paper provides a summary of the information gathered and research conducted on Minimum Content Standards (MCS). Section I of this report provides an overview of state MCS programs including the history of MCS programs, effectiveness of MCS legislation and implementation problems. This report also discusses the positions of those opposed to MCS programs. Section II provides a discussion of the feasibility of implementing MCS in New York City. The impact of MCS on New York City's economy and waste stream are discussed in Section III and Section IV provides recommendations.

Description

Minimum Content Standards direct manufacturers to reduce the quantity of virgin material and increase the percentage of recycled material used in the manufacture of specific products or product packaging. Various states have enacted laws or established administrative MCS policies to mandate or encourage manufacturers to use recycled feedstock. MCS directly impact the specifications for manufacturing a product or packaging and may be limited due to technical, legal or economic criteria.

Although MCS may be implemented by Federal, state or local law, regulation or agreement, MCS implemented at the Federal level would have the greatest impact on the manufacture of products in the U.S. MCS implemented at the state or local level impose a significant burden on manufacturers who ship product between states. As discussed later in this report, legislatures must look beyond their local or state boundaries and work together to design thoughtful, innovative, consistent MCS programs.

The MCS programs presented within this report concern standards implemented at the state level. The burden on manufacturers to meet MCS at the local level would be too costly and are not practical. Designed to promote markets for recycled feedstock, MCS have been set for products ranging from newsprint and plastic bags to rigid plastic containers and glass. In states that have MCS, only those products that meet the MCS are available for sale. Exhibit 1 summarizes several existing MCS programs in the United States.

MCS indirectly provide incentives for cities and municipalities to collect recyclable commodities. MCS effectively increase industrial demand for recycled materials, therefore increasing the value of these commodities, increasing the price paid for recycled materials, and stabilizing prices.

MCS may be set as a percentage of recycled content per unit or an average content percentage of the recycled material incorporated annually across a product or package line. For example, many states require newspaper publishers to incorporate a specific percentage of recovered content in newspapers, requiring either that the minimum content be met for each newspaper, or allowing the content standard to be a percentage of the total newsprint purchased on an

annual basis. Some states have legislated that the MCS will increase over time. For example, California's MCS on plastic trash bags increases from 10 percent in 1993 to 30 percent for 1997.

Products affected by state-level MCS include: newsprint, trash bags, plastic containers, telephone directories, fiberglass and other items. The following summaries provide an overview of selected MCS by product.

Newsprint

Minimum content standards for newsprint vary from state to state and the approaches to implementing MCS range from the imposition of regulations to the institution of voluntary programs for newspaper publishers. Of the twenty-seven states, and the District of Columbia, with minimum content requirements in place,[1] fifteen are voluntary programs. In 1989, New York State and its newspaper publishers initiated a voluntary MCS for newsprint that calls for 40 percent recovered content by the year 2000. The New York State Department of Economic Development compiled a report based on information from the New York Publishers Association indicating that 23 percent of newsprint contained recovered content in 1992-1993. The 1995 goal was 23 percent, a goal that was met in 1993. No information was reported for 1995 or 1996. According to sources at the Northeast Recycling Council, there is a lack of interest within the association to continue to pursue the minimum content goal of 40 percent by 2000. Although there is no significant coordination between the publishers and the State, the Legislative Commission of Solid Waste Management Assembly Member, Susan John, recently contacted Diane Kennedy, Executive Director of the New York Newspaper Publishers Association, to inquire as to progress in meeting the voluntary goal of 40 percent in 2000.

In addition to MCS for newsprint, several states including CO, NH, NJ, IO and the District of Columbia require government agencies to purchase office paper containing specified levels of recycled content.[2]

Telephone Directories

Telephone directories are increasingly the target of MCS regulations and legislation. New York State does not have legislation requiring MCS for telephone directories. However, the NYNEX phone directories contain between 10% and 20% recycled fiber, with a goal of 40% by 1998, according to John Halenar of NYNEX. Five states including CA, CT, MD, MN, and OR mandate that the paper used to produce telephone directories contains a minimum amount of recycled content. The MCS legislation varies from state to state. For example, California law simply says that effective January 1995 telephone directories distributed in the state are to be manufactured to allow for maximum recycling opportunities for used paper. Connecticut law requires all publishers of directories, on a state-wide basis, meet post-consumer recycled content minimums.

[1] Thompson Publishing Group, *Environmental Packaging U.S. Guide to Green Labeling, Packaging and Recycling*, p. 73, 1995.

[2] *Ibid.*

Maryland law sets recycled content standards that increase each year. Minnesota requires that all telephone directories with more than 7,500 listings be printed on recycled paper and mandates the use of post-consumer recycled paper where there are multiple suppliers of recycled paper. Finally, Oregon law specifies that a MCS of 25% by weight must be met, provided that recycled content paper is available and of the same quality as virgin paper. Oregon law also mandates recycling and reporting requirements.

Trash Bags

Plastics comprised an estimated 19.8 million tons or 9.5 percent of municipal solid waste generated in the U.S. in 1994.[3] The overall recovery of plastics in 1994 was 4.7 percent of generation and, according to the U.S. Environmental Protection Agency, an estimated 1.9 percent of plastic bags, wraps and sacks were recovered. Two states have established MCS for plastic trash bags. Currently, California law requires trash bags of over 1-mm thickness to contain 10 percent post-consumer recovered plastic. The requirement will be raised to 30 percent for bags of over 0.7-mm thickness in 1997. The primary intent of the MCS is to increase the use of recycled feedstock. The requirements in the MCS legislation also encourage manufacturers to reduce the overall amount of material used to manufacture trash bags by phasing in more stringent standards aimed at reducing the thickness of the bags along with increasing the recovered content. Manufacturers that can reduce the overall amount of material used in trash bags and produce a reliable trash bag of less than 0.7-mm thickness do not have to meet the MCS. In Iowa, plastic trash can liners must contain recycled content. The law also specifies that 10 percent of the plastic can liners purchased by state agencies contain at least 30 percent recycled material.

Exhibit 1 provides an overview of state MCS programs as of the calendar year 1995.

[3] *Characterization of Municipal Solid Waste in The United States: 1995 Update*, United States Environmental Protection Agency, Solid Waste and Emergency Response, EPA530-R-96-001, March 1996.

Exhibit 1: Summary of MCS Programs in the United States (1995)

STATE: Arizona **Commodity:** Newsprint	**Minimum Content Standards:** 1991: 25% recycled content, 1994: 30%, 1996: 35%, 1998: 40%, 2000: 50%
STATE: California **Commodity:** Newsprint, Glass Containers, Telephone Directories, Rigid Plastic Packaging Containers (RPC), Trash Bags, Fiberglass	**Minimum Content Standards:** ***Newsprint:*** 1992: 25% recycled content, 1994: 30%, 1996: 35%, 1998: 40%, 2000: 50% ***Glass containers:*** All containers must contain the following percentages of recycled glass 1992: 15%, 1993: 25%, 1996: 35%. Records of rejected batches must be reported. ***Telephone directories:*** are to be manufactured of materials that allow for maximum recycling. No percentage is prescribed. ***Rigid plastic packaging containers (RPC):*** with a capacity of 8 oz to 5 gallons must meet one of four criteria: • Be made from at least 25% post-consumer material • Be recycled at one of the following four recycling rates: 25% for all RPCs; 55% for RPCs made primarily of PET; 45% for product associated RPCs (*e.g.*, Brand X salad dressing containers); or 45% for all particular-type RPCs, such as all milk containers • Be refillable • Be a source-reduced container (*e.g.*, lightweighted) California has set several waivers and exemptions associated with RPC regulations including: Containers for which it is technologically infeasible to meet the requirement, Containers sold outside the state, Containers used for drugs, medical food and infant formula, and Containers used for food and cosmetics, until 1997. **Trash bags:** of a certain thickness must contain a percentage of recycled post-consumer material: • 10% for bags of 1.00 mil or greater thickness by 1/1/93 • 20% for bags of 0.75 mil or greater thickness by 1/1/96 • 30% for bags of 0.75 mil or greater thickness by 1/1/97 ***Fiberglass:*** manufacturers must use a certain percentage of glass cullet in making fiberglass: 1992: 10%, 1994: 20%, 1996: 35%, 1998: 40%, 2000: 50%.
STATE: Colorado **Commodity:** Newsprint *(voluntary by 1998)*, Paper used for state court documents (1994)	**Minimum Content Standards:** ***Newsprint:*** average of 30% recycled fiber by 1998. ***Paper:*** for all documents submitted to state courts must contain 50% recycled content including 10% post-consumer materials.

Exhibit 1 (continued): Summary of MCS Programs in the United States (1995)

STATE: Connecticut **Commodity:** Newsprint, Telephone Directories	**Minimum Content Standards:** ***Newsprint:*** On a state-wide basis newspaper printers and publishers must use newsprint containing the following percentages of post-consumer recycled fiber: 1992: 11%, 1993: 16%, 1994: 20%, 1996: 23%, 1997: 31%, 1998: 40%, 1999: 45%, 2000: 50% ***Directories:*** On a state-wide basis paper used for directories must contain the following percentages of post-consumer recycled fiber: 1995: 10%, 1996: 15%, 1997: 20%, 1998: 25%, 1999: 30%, 2000: 35%, thereafter 45%
District of Columbia **Commodity:** Paper (1994), Newsprint (1990)	**Minimum Content Standards:** ***Paper:*** As of January 1994, anyone selling or distributing paper or a paper product must ensure that the item contains, in the aggregate, and for the calendar year (CY), the minimum percentage of recycled content designated in regulations issued by USEPA. For CY 1994, the MCS were as follows: • High Grade Bleached - 50% • Unbleached Packaging - 5-35% • Tissue Paper - 5-40% • Paperboard - 80-90% ***Newsprint:*** The recycled content percentage requirement for newsprint is 20%.
STATE: Illinois (1991) **Commodity:** Newsprint	**Minimum Content Standards:** ***Newsprint:*** must have an annual average recycled fiber usage consistent with the following goals: 22% by 1/1/91, 25% by 1/1/92, 28% by 1/1/93.
STATE: Iowa **Commodity:** Plastic Trash Bags (state agencies 1995), Newsprint *(voluntary)*, Soy Based Ink (1995)	**Minimum Content Standards:** ***Plastic Bags:*** 10% of plastic trash bags purchased by state agencies were required to contain at least 30% recycled material by 7/1/95. The percentage of purchases increases 10% per year until it reaches 50%. ***Newsprint:*** publishers must use newsprint that contains 40% recycled content by the year 2000. ***Soy Based Ink:*** must be used to print government documents.
STATE: Kentucky (1994) **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** Publishers have agreed to work toward a goal of 50% recycled content in newsprint with no deadlines.
STATE: Louisiana **Commodity:** Newsprint *(voluntary* by 2000)	**Minimum Content Standards:** ***Newsprint:*** Publishers reached a voluntary agreement to use 40% recycled newsprint by 2000.
STATE: Maine **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** Newspaper publishers reached a voluntary agreement to use 16% recycled materials by 1995.

Exhibit 1 (continued): Summary of MCS Programs in the United States (1995)

STATE: Maryland **Commodity:** Newsprint (1994), Telephone Directories	**Minimum Content Standards:** ***Newsprint:*** newspapers distributed in the state must contain the following percentages of recycled content: 1992: 12% , 1993: 15%, 1994: 20%, 1995: 25%, 1996: 30%, 1997: 35%, 1998: 40%. ***Telephone directories:*** must have the following recycled content percentages: 1994: 12%, 1995: 15%, 1996: 20%, 1997: 25%, 1998: 30%, 1999: 35%, 2000: 40%.
STATE: Massachusetts **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** The Massachusetts Publishers Association agreed to adopt the following goals for recycled newsprint consumption expressed in terms of total recycled fiber to total fiber: 1993: 13%, 1995: 23%, 1997: 31%, 2000: 40%.
STATE: Minnesota **Commodity:** Telephone Directories (1992), Newsprint *(voluntary by 1990)*	**Minimum Content Standards:** ***Telephone Directories:*** Requires that all directories with more than 7,500 listings must be printed on recycled paper and mandates the use of post-consumer recycled paper where multiple suppliers of paper made from post-consumer recycled content exist. ***Newsprint:*** voluntary agreement with publishers reached in 1990 to use 25 percent recycled content in newsprint.
STATE: Missouri **Commodity:** Newsprint	**Minimum Content Standards:** ***Newsprint:*** Each newspaper publisher with an average daily distribution of more than 15,000 copies shall certify the total tons of newsprint and the average recycled content. The targets for recycled content are: 1993: 10%, 1994: 20%, 1995: 30%, 1996: 40%, 2000: 50%
STATE: New Hampshire **Commodity:** Newsprint *(voluntary)*, Paper (state agencies)	**Minimum Content Standards:** ***Newsprint:*** Industry has agreed to use recycled materials when they are available. ***Paper:*** State agencies are required to buy paper containing 50% recycled material including 10% post-consumer content.
STATE: New Jersey **Commodity:** Paper (state agencies)	**Minimum Content Standards:** ***Paper:*** State agencies are required to buy paper containing 60% recycled content by 1993 and 65% recycled content by 1995.
STATE: New York **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** A voluntary agreement with industry targets 40% recycled content in newsprint by 2000.
STATE: North Carolina **Commodity:** Newsprint, Polystyrene Foam	**Minimum Content Standards:** ***Newsprint:*** The recycled content of newsprint consumed by a newspaper publisher shall equal or exceed: 1992: 12%, 1993: 15%, 1994: 20%, 1995 and 1996: 25%, 1997 and 1998: 30%, 1999 and 2000: 35% After 2000: 40%. ***Polystyrene foam products*** used in conjunction with food for human consumption must be composed of 25% recycled material. In 1995 the provision to ban polystyrene if recycled rates were not achieved was repealed.

Exhibit 1 (continued): Summary of MCS Programs in the United States (1995)

STATE: Ohio **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** The newspaper publishing industry voluntarily agreed to use the following specified amounts of recycled materials in newsprint: 1993: 11%, 1996: 23%, 1998: 31% and 2000: 40%.
STATE: Oregon **Commodity:** Newsprint, Telephone Directories, Glass, Rigid Plastic Containers	**Minimum Content Standards:** ***Newsprint:*** Every newsprint consumer must ensure that at least 7.5% of the annual aggregate fiber content of newsprint used is composed of post-consumer waste paper, provided newsprint is available at the same or lower price as virgin material, the mechanical and optical quality is adequate, and that recycled content newsprint is available. ***Telephone Directories:*** must have a minimum recycled content of 25% by weight, with no less than 15% post-consumer content if it is available and if the quality is the same as virgin paper. Directories must be made with bindings and inks that do not impede recycling. ***Glass:*** As of 1/1/98 every glass container manufacturer must report the total amount in tons of new vs. recycled glass used in the food, drink, and beverage containers it sells in Oregon. Each glass manufacturer shall use the following minimum percentages of recycled glass in manufacturing food, drink or beverage containers: 35% after 1/1/95 and 50% after 1/1/00. ***Rigid Plastic Containers*** (RPCs): Rigid plastic containers sold after 1/1/95 must meet one of three recycling rate options or be made of plastic containing 25% post-consumer material (the recycled content option), or must be reused or refilled (the reuse option), or meet one of five exemption criteria. The recycling rate compliance options are: The aggregate recycling rate for all RPCs must reach 25% The recycling rate for a specific type of RPC, such as milk jugs or a specific resin type, must be at least 25% The recycling rate for a product associated container, for example all Brand X detergent bottles, must be at least 25%. Oregon's rule provides exemptions for; (1) food packaging (under a 1995 amendment), medical packaging, (2) export packaging, (3) tamper resistant parts, (4) a reduced container (one that has been reduced by 10% in size over the same container used for the same product five years earlier), (5) if substantial investment has been made in achieving the 25% recycling rate and there are viable markets for the material collected and the recycling rate is at least 20% and reasonable projections show the material will meet the recycling goal within two years, then there is a two year exemption.
STATE: Pennsylvania **Commodity:** Newsprint *(voluntary by 1995)*	**Minimum Content Standards:** ***Newsprint:*** The newspaper publishing industry reached a voluntary agreement with the state in which it agreed to use 50% recycled material in newsprint by 1995.
STATE: Rhode Island **Commodity:** Newsprint	**Minimum Content Standards:** ***Newsprint:*** Newsprint consumers are required by law to purchase newsprint manufactured with 40% recycled content by 2001.

Exhibit 1 (continued): Summary of MCS Programs in the United States (1995)

STATE: South Dakota **Commodity:** Newsprint *(voluntary by 1991)*	**Minimum Content Standards:** ***Newsprint:*** A voluntary agreement with newspaper publishers targets a minimum of 20% recycled newsprint use by 1991.
STATE: Texas **Commodity:** Newsprint	**Minimum Content Standards:** ***Newsprint:*** Texas law mandates the use of 10% recycled material in newsprint by 1993, increasing to 30% by 2000.
STATE: Vermont **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** A voluntary agreement with newspaper industry targets use of newsprint manufactured with 40% recycled content by 2000.
STATE: Virginia **Commodity:** Newsprint *(voluntary)*	**Minimum Content Standards:** ***Newsprint:*** A voluntary agreement with newspaper industry sets a goal of 30% recycled material by 1995.
STATE: West Virginia **Commodity:** Newsprint	**Minimum Content Standards:** ***Newsprint:*** A state law requires newspaper publishers to use recycled content in newsprint, but does not set specific rates.
STATE: Wisconsin **Commodity:** Newsprint, Plastic Containers	**Minimum Content Standards:** ***Newsprint:*** Wisconsin set the following minimum post-consumer recycled content requirements for newspapers: 10% in 1992 and 1993, 25% in 1994 and 1995, 35% in 1996 and 1997, 40% in 1998 and 1999, and 45% in 2000 and beyond. ***Plastic Containers:*** As of 1/1/95, no person may sell or offer for sale at retail any product in a plastic container unless the plastic container consists of at least 10% recycled or remanufactured material by weight. There is an exception for persons who sell or offer for sale a food, beverage or a drug in a plastic container if the Food and Drug Administration has not approved the use of the specified recycled or remanufactured content in that plastic container. There is also an exemption for cosmetic containers.

In addition to specifying the MCS for specific products and materials, states have launched voluntary programs targeting the use of a specified minimum quantity of post-consumer recycled material in products or product packaging. For example, the Governor of Massachusetts adopted a recycled content awards program for companies that voluntarily use specified minimum amounts of post-consumer recycled materials. The awards are determined as follows:

- Outstanding Achievement, 90 - 100% post-consumer content
- Gold award, 50 - 90% post-consumer content
- Silver award, 25 - 50% post-consumer content
- Bronze award, 15 - 25% post-consumer content

Companies that voluntarily accept the challenge strive to meet specific targets for the inclusion of post-consumer recycled material in their products or product packaging. Awards are based on 100 percent of the packaging used by the company. In 1995, four companies earned the outstanding achievement award for using more than 90 percent post-consumer recycled content in their products. These companies include Nature's Backyard, Inc. for backyard composters containing 100 percent recovered material, Aerovox Incorporated uses 100 percent post-consumer recovered content for paper products, Conigliaro Industries, Inc. uses 90 percent post-consumer and 10 percent post-industrial material to manufacture recycled packaging products and the Frank C. Meyer Company for folding cartons that contain over 90 percent recovered content. Thirty-eight companies received awards in the 1995 Massachusetts Packaging Challenge.

The Washington Retail Association developed "Preferred Packaging Procurement Guidelines" that have been adopted by more than 750 retail outlets. The guidelines, effective in 1993, set MCS for all types of non-food packaging including:

- 40 percent recycled content in glass,
- 10 percent in rigid plastic,
- 40 percent in industrial paper,
- 15 percent in tissue paper,
- 30 percent in kraft paper,
- 12 percent in writing paper,
- 40 percent in corrugated cardboard,
- 50 percent in liner board, and
- 25 percent in steel and metal containers.

Industry concerns that the "guidelines" would become mandates by the Washington State Legislature have not materialized.

Effectiveness of MCS

Currently, no states have implemented comprehensive, effective programs to test and verify the recycled content of products sold in states that have set MCS. Enforcement of MCS is generally based on manufacturers submission of documentation indicating their use of recycled feed-stock. California law allows for the California Integrated Waste Management Board (CIWMB) to audit manufacturers for compliance but no routine monitoring schedule is established. Exhibit 2 provides an overview of the enforcement procedure in several states. However, the research did not reveal any instances of citations or penalties resulting from failure to comply with an MCS.

Exhibit 2: Overview of Selected State Enforcement of MCS

State/Commodity	Enforcement
Arizona: Newsprint	Persons submitting false information regarding certification of recycled content will be prosecuted for fraud by the Department of Environmental Quality. Civil penalty and will not exceed $1,000.
California: Glass	Law requires filing a rejection form with the Department of Conservation when a load of postfill is rejected. Failure to prepare and submit a completed form results in fines and penalties. Rejected postfill can not be disposed without written permission from the Department of Conservation.
Plastic	Manufacturers may be audited by the California Integrated Waste Management Board (CIWMB) for compliance. Providing false information can result in prosecution for fraud by the state's Attorney General and fines of up to $100,000. Civil penalties of up to $50,000.
Trash Bags	Manufacturers must certify that they have complied with the law during the preceding calendar year. Manufacturers unable to comply must certify the amount of recycled content used and provide the information to the CIWMB. Providing false and misleading information is punishable and the party submitting false information may be prosecuted for fraud.
Connecticut: Newsprint	If newspaper publishers as a group or newspaper printers as a group fail to meet the specified levels they may be assessed a civil penalty at the rate of $5 per ton of shortfall. The fines range from $2,500 to $100,000.
Telephone Directories	The requirements for directories are the same as those for newsprint.
District of Columbia: Paper Newsprint	Refer to DC Law 8-283 (1990)
Illinois: Newsprint	Refer to 415 ILCS 110/2003
Maryland: Newsprint Telephone Directories	Refer to Md. Ann. Code Section 9-1707 Envt. Art. and Code Section 9 - 1709 Envt.Art.
Missouri: Newsprint	Newspaper publishers (daily publishing distribution rate of 15,000 or more copies) shall file a statement with the Department of Natural Resources certifying the total number of tons of newsprint used per CY and the average recycled content. Anyone failing to file a statement or seeking a waiver, who provides misleading information may be punished by civil penalty not to exceed $100 per day of violation.

Exhibit 2 (continued): Overview of Selected State Enforcement of MCS

North Carolina: Newsprint	Effective January 1996, newspaper publishers must pay a tax on every ton of newsprint by which they fall short of the required percentage goals for the use of recycled material.
Oregon: Newsprint Telephone Directories Rigid Plastic Containers	Effective January 1995, unless exempt, every consumer of newsprint shall insure that at least 7.5 percent of the annual aggregate fiber content of all newsprint used by the consumer is composed of post-consumer waste paper if: recycled-content newsprint is available at the same or lower price of virgin paper, it meets the mechanical and optical properties, and is available within the same timeframe as virgin newsprint. Newsprint consumers must file an annual report with the Dept. of Env. Quality including: on the amount newsprint used in short tons; amount of recycled content used in short tons; and aggregate recycled content of the newsprint used as a percent. Effective January 1995, every directory publisher shall insure that directories distributed in Oregon have a MCS of at least 25 percent by weight and that no less than 15 percent of the total weight consists of post-consumer waste. Recycled-content paper must be available and of similar quality. Directories must not contain bindings and inks that impede recycling. Directory publishers must work with local governments to insure that recycling opportunities exist for directories and must file an annual report. Enforcement is delayed until January 1998 and will be delayed one additional year if the recycling rate for rigid plastic containers drops below 25 percent. Fines can be levied at $1,000 per infraction per day.

II. Feasibility of Enacting and Implementing MCS in New York City

Allowing for Market Adjustments

One of the greatest implementation problems posed by MCS is ensuring a reliable source of recyclable feedstock to meet the demand that an MCS places on manufacturers. As manufacturers increase their demand for recycled commodities, the prices paid for the recycled feedstock increases to the benefit of municipal recycling programs. This market adjustment is not automatic or immediate. Therefore, it is important that state regulators provide for adequate time within the context of regulations for markets to adjust and for supplies of commodities to meet demand. If sufficient time is not provided, the cost of purchasing regulated materials may increase dramatically and/or manufacturers may contract for long-term supplies of recovered materials outside the state.

Manufacturers have to review the MCS in the context of their current manufacturing process to identify and implement necessary changes to their production process. Also, manufacturers require time to identify reliable sources of high-quality recycled feedstock and to establish contractual purchasing agreements with suppliers. Manufacturers seek guarantees that a steady supply of high-quality recycled feedstock will be available to meet their demands.

As discussed earlier, several states, including New York, have voluntary agreements with publishers regarding the MCS for newsprint. This voluntary approach allows publishers to gradually increase the amount of recycled content in newsprint over a flexible time frame, facilitating compliance while minimizing disruption to production. State and local governments can work with manufacturers to track the available supply of recovered materials and gauge the potential impact of a MCS.

In setting MCS, state legislatures need to consider the state's recycling infrastructure and set realistic timetables and recycling goals that will meet manufacturers' demands for recycled feedstock. Legislatures also need to look beyond their state borders and develop a regional perspective, taking into account the availability of recycled commodities on a regional, national and an international level.

Currently, legislation mandating MCS for targeted products varies between states, as does the process for obtaining waivers or exemptions from the requirements. Developing and implementing MCS for broad categories of products and product packaging is complicated by the fact that products may have a variety of uses (*e.g.*, food versus non-food uses, medical use requirements, etc.) and that the legislation may provide for a variety of mechanisms for exemption. For example, California implemented an MCS for all rigid plastic containers (in November 1996 California exempted food, drug and cosmetic packaging from this requirement) with a capacity of eight fluid ounces to five fluid gallons. Meeting the MCS of 25 percent recovered content is only one of the four ways that plastic containers can meet the requirements of the California law.

If MCS legislation provides criteria to exempt manufacturers from the MCS once a specified recycling rate is achieved, then the implementation challenge becomes developing an agreement between industry and government on how to determine the corresponding recycling rate. State officials in California are working with the American Plastics Council (APC) to determine the recycling rate for plastic bottles. If the recycling rate for all plastic containers meets or exceeds 25 percent, all rigid plastic containers will be exempt from the MCS. The California Integrated Waste Management Board (CIWMB) is working, in conjunction with APC, on a recycling rate range of between 23 percent and 25 percent. Based on this decision, no enforcement actions will occur in 1997. CIWMB is independently determining the 1997 rate. This process has proved complicated and costly for both parties, which have studied the available data and arrived at differing conclusions regarding the recycling rate. Recent data from APC and the National Association for Plastic Container Recovery (NAPCOR) show that the recycling rate for rigid plastic containers is beginning to decrease because of decreased demand for PET and increased consumer use of plastic containers. Until a rate is determined the CIWMB will not take any enforcement actions for non-compliance with the MCS law.

In Oregon, the plastic container recycling rate exceeded the 25 percent recycling rate required to exempt rigid plastic containers from the MCS. Department of Environmental Quality officials attributed a recycling rate of 32 percent to a successful bottle bill and APC attributed the success to a new plastic-sorting facility that was funded, in part, by APC.

Legal and Administrative Factors

Through the establishment of MCS for a wide range of products including newspapers, plastic trash bags, fiberglass, and rigid plastic containers, states have presented a variety of challenges to manufacturers. For example, manufacturers face administrative and process design decisions when their distribution networks include states that have set minimum content requirements for a particular product and neighboring states that do not impose MCS. Rather than distributing from one uniform product line they may ship MCS conforming products to the states with MCS requirements and direct their original design stock or packaging to the states with no requirements. Alternatively, the manufacturer may choose to modify their overall process and produce only MCS conforming products. This design can benefit the entire region they serve by improving markets for recycled material and possibly by helping to increase recycling rates. However, when manufacturers have regional production facilities, they may manufacture a product that meets the MCS where required and in another plant they may manufacturer a product that does not contain any recycled content. Based on the supply and availability of recycled feedstock, manufacturers may reserve the recycled feedstock for production runs in which the products are to be sold in a state with an MCS. Manufacturers who have a nation-wide distribution network and sell two products, one that meets an MCS and one made from virgin material, may face logistical and administrative barriers as they try to meet an MCS and maintain cost-effective distribution networks.

Finally, one of the implementation problems associated with legislating an MCS is enforcement. As states tighten budgets, many find it difficult to fund enforcement programs. States continue to rely on both voluntary and mandatory reporting mechanisms to track the implementation and effectiveness of MCS.

Food and Drug Administration Factors

According to industry sources, another challenge to implementing MCS is the U.S. Food and Drug Administration's (FDA) restrictions on using recycled content in packaging that is in direct contact with food and cosmetics. Industry opposition to MCS has reinforced concerns over use of recycled content packaging in food and cosmetic containers. Within the food and cosmetics industries, companies are striving to achieve source reduction goals rather than incorporating a minimum amount of recycled content into their product packaging.

The FDA regulates packaging that comes in direct contact with food and must provide a letter of "no objection" for any food packaging containing recycled content. Under the National Environmental Policy Act, the FDA is required to consider the environmental impact of any decisions regarding the use of recycled content in food packaging on the solid waste stream. With the provision that food safety will not be compromised, the FDA supports the use of recycled content materials in the manufacture of food packaging. Although no specific regulations for using recycled feedstock in packaging or recycled content packages that come in contact with food have been issued, the FDA has specifically not objected to the use of recovered materials in the following products:[4]

[4] Thompson Publishing Group, *Environmental Packaging U.S. Guide to Green Labeling, Packaging and Recycling*, Tab 800, p. 37, 1993.

- Grocery bags
- Polystyrene (PS) egg cartons
- Polyethylene (PE) and polypropylene (PP) crates
- Polyethylene terephthalate (PET) baskets
- Regenerated PET for use in food-contact items
- Paper egg cartons

FDA's Division of Food Chemistry Technology, Center for Food Safety and Applied Nutrition, issued formal guidance to assist manufacturers in evaluating processes for producing packaging using post-consumer recycled plastic. In addition, industry formed a task force to address members' concerns and to develop an approach for the use of recycled plastic in products that come in direct contact with food and cosmetics.

III. Impact of MCS on New York City's Economy and Waste Stream

Utilizing Existing New York State Legislation

New York State's packaging tax law, Section 1201 (f) (1) of the New York State Tax Code, allows a tax to be placed on the sale of containers made in whole or in part of rigid or semi-rigid paperboard, fibre, glass, metal, plastic or combination of such materials. The containers designated in the law include: barrels, baskets, bottles, boxes, cans, cartons, carrying cases, crates, cups, cylinders, drums, glasses, jars, jugs, pails, pots, rigid foil containers, trays, tubes, tumblers, and vessels. The law also requires that containers manufactured with a minimum recovered content will receive a credit of a portion of the tax.

Exhibit 3 provides an overview of the minimum percentages of recycled materials specified in the law. In addition, the law also specifies that containers used as receptacles for food, beverages, and health supplements shall be exempt from the tax. Containers used for fruit juice (less than 70 percent natural juice), soft drinks, soda dispensed at fountains, beer and wine are not included in the exemption. The law seemingly has never been implemented or enforced in New York State.

Exhibit 3: MCS Specified in Existing NY Law

Container Type	% Recovered Content
Paperboard	80% if boxboard, 30% if foodboard or containerboard
Metal	30% increasing to 40%
Glass	20% increasing to 30%
Plastic	30%

Likely Proponents and Opponents

To the extent that minimum content standards can expand and stabilize local recycling markets, thus reducing costs or increasing revenues for operating municipal recycling programs, minimum content standards would likely be supported by state and local government, fiscal monitors, municipal bond raters, and others who recognize the benefits of reducing municipal

waste management and recycling costs. Recycling and environmental advocates, as well as recycling industries, would also likely support this legislation.

Private contractors, who collect, process and/or market recyclable materials, will likely support an MCS because of the potential increase in the price of the commodities due to the surge in demand. The increase in demand for recovered feedstock can enable processors to increase production and hire additional staff.

Opponents would be the regulated industries, and perhaps consumer advocates who fear the legislation could have inflationary impacts.

Manufacturers, publishers, states, cities, and members of the public have all raised concerns over MCS. For example, when a state mandates an MCS for newsprint, paper suppliers and publishers may express concern that the supply will not keep pace with the demand, raising the potential for manufacturers to at least initially offer newsprint of a lesser quality than virgin newsprint. If MCS legislation requires cities and municipalities to guarantee a supply of recyclable materials, cities and towns may be concerned that the curbside and drop-off recycling programs will not provide a constant supply of recycled feedstock. Finally, consumers are likely to oppose any changes that may increase the price and decrease the perceived quality of available products.

Some states have taken steps to help defuse opposition by providing exemptions to manufacturers if the supply of recycled feedstock generated in the state does not meet manufacturers' demand. States also have provided exemptions if prices for recycled material exceeds the price of virgin materials.

States also have provided flexibility in meeting the MCS requirements. For example, in Connecticut, newspaper publishers have the option of either requiring that every newspaper printed will contain 40 percent recovered content or that over the course of a year, all newspapers published will achieve an aggregate of 40 percent recovered content. This option allows the publisher the flexibility to respond to changing supplies and fluctuations in the price of recycled newsprint.

Other Programs That May Work in Conjunction with MCS

The effectiveness of Federal, state and local government programs involving the enactment of MCS on manufacturers depends in part on government efforts to work with manufacturers and to purchase the products that contain the specified recycled material. Procurement guidelines, price preferences, and set-asides (described below) provide some assurance to manufacturers that markets will stabilize and grow.

1. Procurement Guidelines

Although this report is not intended to address affirmative procurement or purchasing preferences, it is important to note that Federal and many state and local governments require

government agencies to purchase products that contain recycled content. Section 6002 of the Resource Conservation and Recovery Act (RCRA) directs the U.S. Environmental Protection Agency to establish guidelines for Federal agencies to purchase "items composed of the highest percentage of recovered materials practicable." To date, EPA has established procurement guidelines for items ranging from paper and paper products to trash bags and vehicular products. For example, the Federal guideline for plastic trash bags is 10 to 100 percent recovered content and the guideline for writing paper is 50 percent recovered content. A list of the U.S. Environmental Protection Agency's guideline items is included as Appendix A.

President Clinton issued Executive Order (E.O.) 12873, October 22, 1993, directing agencies to develop and implement affirmative procurement programs for all items designated as guideline items. Agencies also are directed to ensure that these programs require that 100 percent of agency purchases of products meet or exceed the guideline standards. In addition, E.O. 12873 set the minimum content level for commodity paper (*e.g.*, copier paper, computer printout paper, etc.) at 20 percent post-consumer material and specialty paper at 50 percent recovered material, including 20 percent post-consumer fiber.

In response to reduced recovered paper supplies, which resulted in economic disincentives for the smaller paper mills producing specialty paper to bid on Federal government paper contracts, President Clinton signed E.O. 12995, March 5, 1996. The E.O. eliminated the requirement that specialty paper contain 50 percent recovered material. Under this order, all printing and writing paper grades are now required to contain *either* 20 percent post-consumer fiber *or* 50 percent total recycled fiber. The 20 percent post-consumer requirement will be increased to 30 percent beginning December 1998.

2. Price Preferences

Price preferences allow state and local agencies to purchase products with recycled content at a price higher than their virgin counterparts. The price variance is set by legislation. Forty-five states have established purchasing preferences for targeted products (*e.g.*, paper, plastics, oil, compost.) For example, California set a price preference of ten percent for print grade paper that meets the state's requirements of 50 percent secondary and 20 percent post-consumer content. New York State's purchasing guidelines provide for a 10 percent price preference for all products made from recycled material. Products containing 50 percent New York waste are provided an additional five percent price preference.

3. Set-Aside Programs

Another state measure to ensure markets for products with recycled content is the development of set-aside programs. Set-aside programs require state and local agencies to set aside a percentage of the procurement dollars for select items made with recycled content. For example, California enacted a 50 percent set-aside for the purchase of recycled paper in 1996 (*i.e.*, 50 percent of all budgeted paper procurement dollars are set aside for the purchase of paper meeting the State's recycled content requirements).

Establishing MCS in New York City

As previously discussed, establishment of MCS for products and packaging is most appropriate at the Federal level, or if not nationally, at the state level. The MCS may impact the City by increasing demand, thereby reducing City costs or generating greater revenues, for materials collected by DOS, and also improving markets for those recyclable materials generated by the private sector, thereby further benefiting the local economy.

The impact of MCS on New York City's economy could depend on a variety of factors. Most notably is the potential for use of recycled commodities generated by residents and City businesses and businesses within reasonable proximity to the City. The trading of recycled commodities is on a regional and/or national level, making it difficult to quantify the impact that an MCS may have on the market for recyclables collected in New York City.

If MCS are set for a product or product packaging manufactured in New York, and manufacturers enter into long-term contractual agreements to buy recycled feedstock generated by New York City's Recycling Program, then the City may recognize a significant impact in the demand for its collected recyclables. This increase in demand would increase the value of our collected recyclables, ultimately reducing the tipping fees or generating revenues from the sale of recyclable materials collected by the City.

If New York City is to support Federal, New York State, or local MCS, the decision should be based on a consideration of the components of New York City's solid waste stream. According to the New York City Department of Sanitation's waste composition study conducted in 1989-90, paper is the largest commodity in the waste stream discarded in the City and represents approximately 42 percent of the solid waste stream. Therefore, New York City may want to consider proposing or supporting MCS legislation on products containing post-consumer paper. Food waste and yard trimmings make up the next largest components of the waste stream. Following these components, the Department's report notes that New York City's waste stream is similar to that of the United States, indicating that approximately nine percent of the waste stream is comprised of plastics and more than six percent is glass.

Exhibit 4 illustrates how sample MCS for specific products may impact New York City by creating a demand for the recyclable commodities in the solid waste stream. These sample products reflect MCS programs that are in effect in other states, and which could potentially be examined for adaptation nationally or in New York State.

For those products that are manufactured in or near New York City, implementing an MCS may lead to an increase in the number of jobs related to materials collection and materials processing. New York City generates large volumes of recycled feedstock and is a primary source of recycled feedstock for the Northeast. New York City can establish itself as a reliable, consistent source for recycled feedstock and can encourage new manufacturing facilities to locate within the City. Manufacturers, who locate in the City, will recognize reduced transportation costs for the recovered, processed material. Locating new manufacturing businesses in the City will provide employment opportunities.

Exhibit 4: Sample MCS for New York State

PAPER PRODUCTS	
MCS[5]: 1998 - 50% total recovered content with 10% post-consumer content. 2000 - 50% total recovered content with 30% post-consumer content.	
Potential Impacts: • Reinforces demand for recycled paper • Provides a reliable market for recycled content paper • Encourages mills to produce recycled content paper • Increases the efficiency of collection and separation of paper	
Proposed MCS Requirements:	**Potential Impact for Market Development:**
Public Utility Bills *(e.g.,* Brooklyn Union, Con Edison, Water and Sewer bills, telephone) Assumptions: 2.8 million households receive 36 utility bills per year A bill consists of 2 envelopes and one sheet of paper weighing .6 oz.	• Strengthens the market demand for 945 tons of recycled content paper and envelopes • Sets a precedent for other companies that mail a large number of bills • Promotes a positive environmental message • Enhances Cost Effectiveness of DOS Recycling Program
Catalogues Mailed at Bulk Rate in quantities over 1,000,000 to addresses in New York Assumptions: 2.8 million households receive 1.7 catalogues per week[6] Average catalogue weighs 8 oz.	• Strengthens the market demand for 30,940 tons of recycled content paper • Encourages more efficient separation of paper from the waste stream by processors • Enhances Cost Effectiveness of DOS Recycling Program
Weekly Magazines with a circulation of over 250,000 in New York Assumptions: 2.8 million households receive 1 magazine per month Average weekly magazine weighs 5 oz.	• Strengthens the market demand for 2,625 tons of recycled content paper • Enhances Cost Effectiveness of DOS Recycling Program

It may be difficult to predict what effect an MCS may or may not have on product prices. There may be an initial price increase in product that is manufactured with post-consumer recovered content. When Federal and state governments required an MCS in writing paper, the price of recovered content writing paper increased due to the lack of supply of post-consumer recycled paper. As the supply increased and manufacturers were able to purchase recycled paper, the cost of writing paper with recovered content has leveled at or near the price for virgin writing paper. New York City may see an initial price increase in products that require an MCS.

[5]The proposed percentages are based on the recovered content percentages incorporated into the Federal Procurement Guidelines unless otherwise noted.

[6]Dalzel, Chet, Direct Marketing Association, New York, Telephone Interview, August 8, 1996.

Exhibit 4 (continued): Sample MCS for New York State

PLASTIC PRODUCTS

MCS[7]: 1998 - 10% for bags of 1.00 mil or greater in thickness, 2000 - 20% for bags of .75 mil or greater in thickness, 2002 - 30% for bags of .75 mil or greater in thickness.

Potential Impact:

- Strengthens the market for recycled plastic containers and plastic film
- Increases the efficiency of collection and separation of plastics by cities and municipalities
- Enhances cost effectiveness of DOS recycling program

Proposed MCS Requirements:	Potential Impact on Market Development:
Plastic Trash Bags Assumptions: 2.8 million households use 2 bags per week 3.5 million tons of commercial trash per year in New York City and 50% is discarded in bags 30 pounds of trash per bag Plastic trash bag weight 3 oz.	• Strengthens a market for over 3,800 tons of recovered plastic during the first year • An MCS in New York combined with the MCS requirement in California and Iowa may encourage manufacturers to redesign their manufacturing process to effectively serve the entire country
Plastic Bags Used in Retail Trade to transfer goods from retailer to consumer. There is no data available on the number of retail bags used in New York City. The estimates used for this example are based on plastic grocery bags. Assumptions: Between 434.7 and 687.8 million bags are used per year in New York City and the bags weigh between 3,261 tons and 5,159 tons per year[8] Mid-range estimate is 4,000 tons per year	• Strengthens the market for 400 tons of recycled plastic (not including the potential market for plastic retail bags other than plastic grocery bags)
MCS: 2000 - 25% post-consumer recovered content	
Rigid Plastic Containers with a capacity of 8 oz. to 5 gallons. Assumptions: 1994 U.S. generated 2.08 million tons of plastic containers[9] 70% of the containers are between 8 oz. and 5 gal. = 1.4 million tons of plastic containers in U.S. 40,000 tons of plastic containers in New York City	• Creates a market for 10,000 tons of recycled plastic • Enhances cost effectiveness of DOS recycling program

Exhibit 4 (continued): Sample MCS for New York State

GLASS PRODUCTS	
MCS: Beverage containers 2000: 35% recovered content, 2005: 50% recovered content Fiberglass 2000: 20% recovered glass cullet, 2005: 25% recovered glass cullet	
Glass Beverage Containers Assumptions: 500,000 tons of glass beverage containers in the New York City waste stream[10] Glass beverage containers contain 25% recovered content	• Creates a market for an additional 50,000 tons of recycled beverage containers • Enhances cost effectiveness of DOS Recycling Program
Fiberglass Insulation Assumptions: Local sales data not available and telephone calls were unreturned.	• Establish an MCS that meets the Federal Procurement Guideline of 20% recycled glass cullet and increase the percentage to 25% the second year. Refer to ASTM standard specification D 5359. • Enhances cost effectiveness of DOS recycling program.

However, over time, as supplies of recycled commodities increase and are capable of meeting demand, the price of the MCS product will not be as volatile.

Setting MCS for products sold in the State would likely encourage market development for recycled materials and create a demand for the recycled feedstock throughout the Northeast. An MCS in the State may impact the recyclables markets on a national level. By establishing MCS in an eastern state similar to those set in California, manufacturers who either do not use recycled feedstock or those who only use recycled feedstock for the product that is to be sold in an MCS state may find that for distribution purposes it becomes more efficient to adapt manufacturing processes to meet the MCS in place on both the West, and now the East Coast.

By entering into long-term contracts to supply recycled feedstock to manufacturers, New York City DOS may have the opportunity to begin to stabilize the price for recyclables collected by the City. Commercial haulers also will have an incentive to enter into long-term contractual relationships with manufacturers who demand recycled feedstock to achieve the MCS. As a result of MCS, manufacturers may be more inclined to enter into long-term contracts with New York City DOS and/or with private processors to ensure adequate supplies of recyclable materials needed to meet the MCS.

[7] Requirements based on California's MCS for plastic trash bags.

[8] Graff, Robert, Princeton University, *A Comparison of the Environmental Effects of Kraft Paper and Polyethylene Grocery Bags*, prepared for the New York City Department of Sanitation, 1989.

[9] U.S. Environmental Protection Agency, *Characterization of Municipal Solid Waste in The United States: 1995 Update*, Office of Solid Waste Emergency Waste, March 1996.

[10] See the *Expanded Bottle Bill Report*, August 1996.

IV. Summary and Recommendation

As discussed earlier, paper comprises 42 percent of New York City's waste stream. The City may want to focus on implementing MCS that will create a market demand for post-consumer waste paper. Exhibit 4, previously presented, illustrates that New York City may want to consider implementing an MCS on magazines that are sold in the City.

The voluntary MCS for newsprint sold in New York City was extremely successful in its initial phase, the lack of follow-through by New York State and local regulatory agencies has resulted in the newspaper publishers failure to continue to report progress. It appears that newspaper publishers require constant encouragement to continue the voluntary program and to provide compliance data. New York City may want to consider re-emphasizing the existing voluntary MCS for newsprint and expanding the program to other printed materials distributed in the City (*e.g.*, magazines, advertising brochures, etc.) It appears that voluntary programs are most successful when mandatory legislative programs are under consideration. New York City may want to begin discussing, with magazine publishers, the implications of requiring that magazines distributed in the City contain a minimum content of post-consumer waste paper.

Most of the MCS highlighted in this report are implemented at the state level. It is logical for New York City to work with proponents of MCS and the State Legislature to identify the most appropriate products and product packaging on which to levy an MCS. A review of what other state governments are implementing indicates that MCS are most often applied to products including: telephone and other directories; trashbags; and in several cases on rigid plastic containers.

One of the critical factors in a government supported MCS is the willingness of the legislature to establish an MCS requirement and to commit to implementation of the MCS. When changes occur in the MCS, as a result of an industry/trade association applying pressure on legislatures, companies who have invested in designing or re-designing processes to manufacture recycled products/product packaging may face significant financial challenges as the demand for the recovered-content product may no longer be required.

In summary, the City may want to consider the following:

1) Monitor the existing voluntary MCS program for newsprint and encourage newspaper publishers to comply and report,
2) Promote the results of the voluntary MCS program for newsprint by providing press coverage and awards to those publishers who meet or exceed the stated goals,
3) Initiate a voluntary program for other print media such as magazines, advertising materials, and telephone directories,
4) Establish MCS goals and formulate legislation requiring MCS for products (*e.g.*, newsprint, telephone directories, trash bags, rigid plastic containers) and
5) Form a coalition of supporters (*e.g.*, environmental groups, recycled product manufacturers, etc.) and lobby the New York State Legislature to pass MCS legislation.

Appendix A

Federal Procurement Guidelines

Category/Product	Percent Recovered Content
Paper	
High grade bleached printing and writing paper	50%
Mimeo and duplicator paper	50%
Computer paper	50%
Envelopes	50%
Tissue Products	
Toilet tissue	20%
Paper towels	40%
Paper napkins	30%
Facial tissue	5%
Unbleached packaging	
Corrugated boxes	35%
Vehicular Products	
Lubricating Oil (re-refined oil)	25%
Tires	
retread tires	
Construction Products	
Fiberglass (glass cullet)	20-25%
Cellulose loose-fill and spray-on (post-consumer paper)	75%
Structural fiberboard	80-100%
Laminated paperboards	100%
Cement and Concrete (coal fly ash)	0-40%
Cement and Concrete (ground granulated blast furnace slag)	25-50%
Polyester Carpet Face Fiber (PET resin)	25-100%
Patio blocks (rubber or rubber blends)	90-100%
Patio blocks (plastic or plastic blends)	90-100%
Floor tiles (rubber)	90-100%
Floor tiles (plastic)	90-100%

Category/Product	Percent Recovered Content
Transportation products	
Traffic cones (PVC, LDPE, Crumb Rubber)	50-100%
Traffic barricades (HDPE, LDPE, Pet Steel)	80-100%
Traffic barricades (Fiberglass)	100%
Park and Recreation Products	
Playground surfaces (rubber or plastic)	90-100%
Running tracks (rubber or plastic)	90-100%
Landscaping Products	
Paper-based hydraulic mulch (post-consumer recovered paper)	100%
Wood-based hydraulic mulch (recovered wood and/or paper)	100%
Non-paper Office Products	
Office recycling containers and waste receptacles (plastic)	20-100%
Office recycling containers and waste receptacles (steel)	25-100%
Plastic desktop accessories (polystyrene)	25-80%
Plastic-covered binders (plastic)	25-50%
Chipboard, paperboard, pressboard binders	80%
Plastic trash bags	10-100%

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