

# **A COURSE OF ACTION TO INCREASE RECYCLING IN THE STATE OF DELAWARE**

**March 1, 2000**

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A Course of Action to Increase Recycling  
In the State of Delaware  
March 1, 2000

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## EXECUTIVE OVERVIEW

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The main preliminary findings showed that the people surveyed were supportive of recycling, knowledgeable of the benefits, there was a high level of participation in drop-off programs, and they were interested in doing more.

On April 21, 1999 Delaware's Governor, Thomas R. Carper, signed Executive Order Number 60 establishing the Citizens' Work Group on Recycling. Governor Carper was concerned that even though Delaware's households produced approximately 60% of residential solid waste generated in Delaware, the 'RECYCLE DELAWARE' Program captured less than 5% of that waste.

The 'RECYCLE DELAWARE' Program includes a recyclables drop-off program available state-wide and run by the Delaware Solid Waste Authority. Drop-off sites are located at over 130 sites across the State. Most sites include igloos to collect newspaper/magazines, brown, green and clear glass bottles, plastic bottles, aluminum and steel cans, batteries and corrugated cardboard. Governor Carper was aware of other communities where curbside collection of recyclables had increased diversion of these and other materials from the landfill. Although he was aware that curbside collection often resulted in higher collection costs to homeowners, he also knew that existing curbside collection programs had wide support. Having been approached by several Delawareans expressing an interest in curbside collection, Governor Carper established the Work Group to both determine Delaware's interest in, and willingness to pay for, curbside collection of recyclables and to recommend a course of action to increase recycling in the state.

Executive Order No. 60 identified the individuals and organizations invited to participate on the Work Group, the Chairperson, the Work Group's mission, and the Work Group's timeline. The Executive Order and the Work Group membership list can be found in Appendices A and B, respectively.

The Work Group selected and hired a team lead by the Pennsylvania Resources Council to conduct a survey of Delawareans' views on recycling in general and curbside collection of recyclables in particular. Other team members were the University of Delaware's Center for Applied Demography and Survey Research and Widener University. Over 640 Delaware residents participated in the September 1999 survey. The results of the survey are discussed in more detail in Section 3.0. In addition to the survey, the Work Group toured the Delaware Solid Waste Authority's recycling facilities, scheduled

presentations by individuals with expertise in collection of recyclables, and reviewed numerous reference materials on the subject. Based on the Work Group's findings, the following actions are recommended which we believe can increase residential solid waste recycling up to a maximum of 25%:

RECOMMENDATION	COST
Create an Office of Recycling within DNREC to promote and monitor all recycling efforts within the state. A Recycling Public Advisory Council should also be established to assist and advise the Office.	\$219,657 Salaries \$65,000 Operating (to be reduced in subsequent years)
Establish a voluntary statewide residential solid waste diversion goal of at least 25%.	Can be implemented using existing resources
Establish a statewide education program on recycling within the Office of Recycling.	\$100,000 Contractual Funds Annually
Provide funding for grants to encourage communities, counties and municipalities to implement measures (e.g., curbside collection, pay-as-you-throw) to increase recycling.	\$500,000 Annually
Make it easier for the Delaware Solid Waste Authority to site 'RECYCLE DELAWARE' drop-off sites.	Can be implemented using existing resources
Enact a State Recycled Products Procurement Law.	Can be implemented using existing resources
Enforce Bottle Bill	\$20,000 Annually
Develop and publish a list of local companies who currently sell products made from recycled materials available.	\$20,000 One-Time
Increase the number of igloos at 'RECYCLE DELAWARE' drop-off sites.	To be implemented when economically feasible
Review report on Executive Order No. 82	Does not require an expenditure of funds
Support and expand recycled materials markets	Can be implemented using existing resources
Additional Steps including a mandated diversion rate and waste franchise districts	Same as establishing an Office of Recycling, Grants Program and Education Program

To reach a diversion rate of residential solid waste above 25%, it will be necessary to do all of the above and more. The state will need to mandate a residential solid waste diversion rate for local governments in addition to providing grants to implement waste reduction and diversion measures. If this step is chosen, the Work Group recommends legislation mandating a diversion rate of 30% by 2004, and 40% by 2007 (including yard trimmings). These rates will be challenging and will require significant additional effort and

additional funding. Mandatory measures such as these have ramifications and impacts (e.g., enforcement, staffing, infrastructure) that would need to be addressed by local governments. The Work Group believes that the establishment of franchise districts for the collection of residential solid waste will be necessary in any areas where curbside collection of recyclables is desired. Please note that one member of the Citizens' Work Group on Recycling is not in favor of any sort of local government mandate. Therefore, it will be crucial to involve local governments prior to implementing a mandatory program.

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## 1.0 INTRODUCTION

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### 1.1 History of Recycling in Delaware

The State of Delaware first began promoting recycling in 1975 with the passage of the Delaware Solid Waste Authority's enabling legislation. This led to the opening of the Delaware Reclamation Center, which held the title of the largest recycling/reclamation project in the world for over 10 years. The next major milestones were the implementation of the Beverage Container Law in 1979 and the State-wide recyclables drop-off program, known as 'RECYCLE DELAWARE', established in 1990. The Delaware Solid Waste Authority currently operates over 130 'RECYCLE DELAWARE' centers collecting brown, green and clear glass bottles, plastic bottles, newspaper and magazines, aluminum and steel cans, motor oil, corrugated cardboard, and household batteries (the latter are not recycled, but disposed of properly). Other major milestones in Delaware's recycling history can be found in Table 1.

**TABLE 1: Statewide Recycling Laws, Regulations, Orders, and Policies**

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**Beverage Container Law** (adopted 1979, became effective 1982)

The Bottle Bill was adopted for the purpose of encouraging the reuse and recycling of beverage containers, thereby "removing the blight on the landscape caused by the disposal of these containers on the highways and lands of the State and reducing the increasing costs of litter collection and disposal." The law requires a 5¢ deposit on non-aluminous containers designed to hold less than 2 quarts of:

- any carbonated beverage (commonly called a soft drink) not containing alcohol, or
- beer, ale, or other malt beverage containing alcohol.

Initially, aluminum cans were exempt on a temporary basis. The exemption was renewed every time it was due to expire; the exemption became permanent in 1997.

**Regulations Governing Solid Waste** (DNREC regulations, adopted December 1988)

The regulations attempt to encourage recycling facilities by making recycling more attractive than disposal. Facilities that recycle source-separated materials (normally regulated as solid waste) into specific market applications are exempted from permitting requirements. They still are subject to oversight by DNREC, but the requirements are much less onerous than permit requirements, and there are no fees involved. Transportation of source-separated material for recycling is exempt from regulation by DNREC.

**Executive Order No. 82** (signed by Governor Castle in July 1990)

This Order consisted of 18 individual charges to various state agencies to encourage source reduction, recycling, and waste utilization. Items that specifically pertain to recycling are:

- DSWA shall establish and operate recycling centers in each county; 15 centers shall be in place by 12/31/90. *(This goal was met).*
- DSWA shall evaluate the collection/reuse of hard-to-dispose of items (i.e., white goods) and submit a proposal to the General Assembly and Governor by January 1992. *(This goal has been achieved -- DSWA diverts white goods from the working face of the landfills and contracts with a recycler to take them).*
- DSWA, DNREC, Department of Administrative Services, and DelDOT shall develop a program for composting yard waste and utilizing compost on state land. *(This goal was not met during Castle's*

*administration. However, DSWA is now diverting yard waste from the working face of its landfills and processing and using the material. In addition, three state agencies -- DelDOT, DNREC, and DEDO -- are about to embark on a major compost utilization project funded by DelDOT).*

- DAS shall explore opportunities for purchasing recycled/recovered materials and shall consider specifying a preference for recycled/recovered materials where feasible.
- DAS shall issue bid requests for recycled paper and shall gradually increase the amount of recycled paper purchased by the State, so that in FY 94 no less than 50% of total dollar value of paper products purchased is recycled paper.
- DEDO and DNREC shall establish and promote a program aimed at attracting and assisting industries that are in the recycling business or that make use of recycled materials generated in Delaware. (See Green Industries Initiative, below.)
- DAS shall expand source separation and recycling programs in state offices.
- DNREC and DSWA shall develop public awareness programs for schools, civic organizations, and other community groups to encourage recycling and waste minimization. *(Both DSWA and DNREC developed school curricula addressing solid waste management issues, including recycling and waste reduction. Both have participated in many educational events throughout the state, promoting recycling and waste reduction. Both have developed resources to encourage backyard composting. DNREC, under an EPA grant, sold more than 700 compost bins at a discount during 1997-1998 as part of an effort to recover and utilize nutrients in yard waste. DNREC partnered with the Environmental Defense Fund in a "Buy Recycled" public outreach campaign. DSWA coordinates Delaware's participation in America Recycles Day.)*

**Del. Code, Ch. 64, Subchapter II: Recycling and Waste Reduction** (Effective July 1990)

This amendment to Ch. 64 (which created the DSWA) directs the DSWA to develop a comprehensive statewide recycling and waste reduction program incorporating long range planning, project development, public education and promotion, information gathering, and marketing; and to implement a household hazardous waste collection program. DSWA is directed to incorporate recycling and waste reduction measures into the statewide solid waste management plan; establish recycling centers in each county; educate the public about the purposes and value of source separated recycling and resource recovery; establish a registration program for persons engaged in recycling or resource recovery; develop a marketing program for the sale of recovered materials; develop a program of coordination and cooperation with public interest groups and municipalities to further statewide recycling and waste reduction; and develop incentive programs to encourage local and statewide recycling and waste reduction.

**Green Industries Initiative** (Del. Code, Ch. 20, Subchapter V -- adopted in 1992)

This initiative, administered by DEDO and DNREC, was established for the purpose of attracting to the state companies that will recycle materials from the Delaware solid waste stream, and for encouraging Delaware companies to reduce the amount of waste they generate. The law provides for tax incentives, low-interest loans, permitting priority, and technical assistance for companies that collect or process recyclables or that manufacture a product from recyclables diverted from the waste stream.

**Regulations of the Delaware Solid Waste Authority** (as amended in 1993)

Pursuant to the Recycling and Waste Reduction Act of 1990, DSWA amended its regulations to include a section on recycling. The section requires all persons operating recycling facilities in the state, other than 'RECYCLE DELAWARE' centers, to file an annual report with DSWA. The report is to include information on the nature of the recycling activity, the quantity and type of materials recycled, and the disposition of the materials. It also contains provisions concerning proper use of the 'RECYCLE DELAWARE' centers.

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## 1.2 Executive Order No. 60

In 1998 Governor Carper's office received numerous letters and phone calls from Delaware residents requesting implementation of curbside collection of recyclables. These

requests spurred Governor Carper to call a meeting in late 1998 with representatives of the Department of Natural Resources and Environmental Control, the Delaware Economic Development Office and the Delaware Solid Waste Authority to discuss the feasibility of implementing curbside collection of recyclables in Delaware. The result of this meeting was to form a work group to determine if Delawareans support curbside collection including their willingness to pay. The work group would also recommend ways to increase recycling in Delaware. The resulting Executive Order No. 60 was prepared and signed by Governor Carper at the Solid Waste Forum held in April 1999.

Executive Order No. 60 lays out Governor Carper's reasons for establishing the Work Group. He found that: Delawares households produce 60% of its residential solid waste (RSD), yet only 5% of Delaware's RSD was captured by the 'RECYCLE DELAWARE' program; although curbside collection of recyclables generally came at an additional cost to homeowners, it generally had wide public support; Delaware's citizens had expressed a desire for curbside collection of recyclables but did not have data that clearly supported implementation of curbside collection; and finally that it would be helpful to both the Governor and the General Assembly to have a better understanding of the public's view on curbside recycling programs. The Executive Order established the Citizens' Work Group on Recycling, identified groups/organizations that were to be invited to appoint a representative and named the Director of the Division of Air & Waste Management, or his designee, as the Chairperson. The mission of the Work Group was:

The Work Group shall commission a public opinion survey to determine the level of interest in, and willingness to pay for, curbside recycling, and shall develop and recommend a course of action to increase recycling in the state, taking into consideration the results of the survey.

The Executive Order set the deadline for recommendations as February 15, 2000 and indicated that the cost of the survey was to be borne by the Delaware Solid Waste Authority. The full text of the Executive Order can be found in Appendix A.

### **1.3 Citizens' Work Group on Recycling**

In May 1999 Marjorie A. Crofts, the Division of Air & Waste Management's Deputy Principal Assistant, was named as Chair of the Work Group. Letters were sent from Ms. Crofts to all of the organizations named in the Executive Order asking them to name a representative. The only exception to this was the representative from the Waste Hauling industry, which was named by the Department of Natural Resources and Environmental Control's Cabinet Secretary. The list of members and the organizations they represent can be found in Appendix B. Two organizations named in the Executive Order, The Christina Conservancy and Common Cause of Delaware, declined the invitation to participate. A third organization, the Civic League of New Castle County, was represented by the Delaware Nature Society appointee as he also served as a Director for the Civic League.

By the end of May the membership of the Citizens' Work Group on Recycling was set and the first meeting was held on June 16<sup>th</sup>. The Work Group started right in setting its meeting rules and procedures. All Work Group meetings were open to the public, who were

encouraged to freely participate in meeting discussions and on subcommittees. It also immediately began the ground work for the survey, advertising a Request for Qualifications on June 28<sup>th</sup>. Although much of the June through August meetings were devoted to selecting a contractor to conduct the survey, the Work Group also heard presentations on curbside recycling options used in other states, recycling in Delaware and the Town of Camden's curbside program. In addition, the DNREC and DSWA provided a notebook of information on Delaware's recycle rate and programs and information on recycling in other states.

While waiting for the survey results, the Work Group toured the Delaware Recycling Center and the Cherry Island Landfill, brought in a national expert to brief the Group on potential cost saving strategies for curbside collection programs and learned about the City of Newark's pilot curbside recycling program. The preliminary survey results were presented to the Work Group in October with the final report received in November. The Group met several times in November and December to develop its recommendations, continue to learn about recycling experiences both within Delaware and in other states, and prepare a preliminary report to Governor Carper which was submitted on December 29, 1999.

In late December, the Work Group issued a preliminary report in order to give Governor Carper a recycling strategy to consider in preparing his recommended budget and legislative agenda. Copies of the preliminary report are available from the Division of Air & Waste Management by calling (302) 739-4764. The Work Group continued to meet in January and February 2000 to develop some additional recommendations and finalize this report. A complete list of meeting dates and major agenda items can be found in Appendix C.

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## **2.0 Recycling Survey**

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### **2.1 Selection of Survey Contractor**

One of the two specific tasks of the Citizens' Work Group on Recycling was to "commission a public opinion survey to determine the level of interest in, and willingness to pay for, curbside recycling..." The Work Group prepared both a Request for Qualification Statements (RFQ) and criteria for ranking the RFQs early in its deliberations. The RFQ was advertised on June 28, 1999 in the Delaware Capitol Review. Qualification statements were received from three groups:

- The Melior Group with Market Tech Associates;
- Potomac Incorporated with the Institute of Local Self-Reliance and the Discovery Research Group; and
- Pennsylvania Resources Council with the Center for Applied Demography and Survey Research at the University of Delaware, Maurice Sampson, consultant, and Widener University

A subcommittee composed of Rob Skomorucha, Marian Young, Joan Denney and Marjorie Crofts met to rank the submissions. As all three submitters were determined qualified to conduct the survey, the subcommittee recommended that all three make a presentation to the full Work Group.

Each of the submitters were given specific guidance on presentation content and a numeric ranking sheet was prepared for each member of the Work Group. The presentations were made at the Group's August 4<sup>th</sup> meeting with ranking sheets filled out after each presentation. The team headed by the Pennsylvania Resources Council (PRC) received the most points. The Work Group agreed to select the PRC team and at this point opened their bid.

### **2.2 Survey Contract and Selected Results**

In August 1999 the Delaware Solid Waste Authority, in accordance with the Executive Order, executed a contract with PRC to conduct a survey of 600 Delaware residents on their attitudes and perceptions on recycling. The PRC team drafted a survey based on Work Group guidance, conducted some field tests on the questions, then met with the Work Group in late August to finalize the survey. The University of Delaware's Center for Applied Demography and Survey Research conducted the survey of 647 adult Delawareans (205 in Kent County, 227 in New Castle County, and 215 in Sussex County) in September 1999.

The survey results were divided into three sections: (1) the current status of trash removal in Delaware; (2) the current status of recycling in Delaware; and (3) reactions to recycling options used elsewhere in the country. The survey results that weighted heavily in determining the Work Group recommendations were:

- About 40% of Delawareans are not aware of the 'RECYCLE DELAWARE' drop-off program and 37% are not aware of any recycling opportunities. Two-thirds of the people who don't recycle are also unaware of the drop-off program.
- The dominant reason given for not recycling is inconvenience.
- 40% of people who currently recycle indicated that they would recycle more if their recyclables were picked up at the curb.
- More than 38% would recycle more if the drop-off program were more convenient (more 'RECYCLE DELAWARE' centers, more convenient locations, drop-off sites near shopping locations).
- 25% of Delawareans do not have curbside pickup of trash.
- Among those who don't currently recycle (24%) but would like to, there was little difference between the percentage that would prefer curbside pickup (49%) and the percentage that would like more convenient access to drop-off sites (45%).
- Almost 80% of Delawareans indicate that they would probably be willing to participate in a curbside recycling program if there were no additional cost, 41% would participate if it were to cost them \$1/month, and 23% if it cost them \$3/month.
- 9% of Delawareans said they would not recycle regardless of the collection method.
- 55% of Delawareans are aware that they purchase bottles that have deposits. Of these, 58% return the bottles for a refund.

In addition, the survey results clearly show that awareness is directly related to recycling participation. For example, 'RECYCLE DELAWARE' centers take both magazines and telephone books. However, only 21% of those that currently recycle include magazines and only 10% include telephone books in their recycled materials delivered to drop-off centers. When asked what they would like to recycle, the same set of people responded with 42% magazines and 32% telephone books. In other words, people who currently recycle are unaware that 'RECYCLE DELAWARE' centers accept magazines and telephone books. In addition, survey results show that 15% of those that don't currently recycle don't know how and two-thirds of the people who don't recycle are also unaware of the 'RECYCLE DELAWARE' drop-off centers.

Copies of the final survey report are available by calling the Division of Air & Waste Management at (302) 739-4764.

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## 3.0 Delaware's Recycling Rate and Programs

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### 3.1 Delaware's Waste Generation and Recycling Rates

A report completed by the Franklin Associates on Delaware's municipal solid waste (MSW) stream for 1997 estimated a total MSW generation of 626,100 tons. The percent that is recycled is dependent upon what definition of recycling and composting is used. According to the U.S. Environmental Protection Agency (EPA) definition, 22% was recycled in 1997. EPA estimates the national rate to be 27%. If tire and major appliance diversion is included in the definition, then 24% was recycled. When energy recovery is added to the definition, the rate goes up to 64%.

MSW is composed of both residential solid waste (RSW), or waste from homes, and commercial solid waste, or waste from businesses. The Work Group focused its efforts on RSW. Excluding yard trimmings, Delaware generated approximately 238,847 tons of RSW in 1997. The recyclable material targeted by 'RECYCLE DELAWARE' drop-off sites is estimated at 73,800 tons, or 20% of RSW. 'RECYCLE DELAWARE' recovered 23%, or 17,100 tons of the recyclable material it targeted in 1997 through its drop-off collection program. This represents 5% of Delaware's total RSW. These figures are summarized in Table 2. The Delaware Solid Waste Authority (DSWA) includes the collection of white goods, tires, yard trimmings and household hazardous waste under its 'RECYCLE DELAWARE' program and these items are not taken into account in Table 2.

**TABLE 2: Delaware's RSW Generation and 'RECYCLE DELAWARE' Rates**

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	<u>Tons</u>	<u>% of RSW</u>
Municipal Solid Waste (MSW)	626,100	N/A
Residential Solid Waste	372,195	100
Recyclables Targeted by 'RECYCLE DELAWARE'	73,800	20
'RECYCLE DELAWARE' Collection <sup>1</sup>	17,100	5

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Source: Franklin Associates Report

Notes: 1. Includes newspaper/magazines/phonebooks, green/brown/clear glass, aluminum/steel cans, narrow-necked plastic bottles, textiles and corrugated cardboard deposited through 'RECYCLE DELAWARE' drop-off centers.

The Franklin Report does provide information breaking out RSW recovery rates from MSW. This report estimates that Delaware generated 372,195 tons of RSW in 1997 and recovered 51,036 tons for a recovery rate of 14%. Table 3 provides information on Delaware's RSW recovery rates.

**TABLE 3: Delaware's RSW Generated and Recovered in Tons/Year**

	<u>Generated</u>	<u>Recovered</u>
Residential Solid Waste Including Yard Trimmings	372,195	51,036
Durable Goods (Appliances, Furnishings, etc)	68,500	9,234
Nondurable Goods (Paper, Textiles, etc)	94,769	20,260
Glass Packaging	20,055	7,783
Steel Packaging	6,655	7,783
Aluminum Packaging	3,410	1,597
Paper and Paperboard Packaging	26,430	270
Plastic Packaging	18,748	1,895
Other Packaging	280	0
Other Wastes (Food, Yard Trimmings, Etc)	133,348	7,969

Source: Franklin Associates Report

Estimating solid waste generation and recovery rates is an inexact science. The DSWA can provide accurate figures of the tons of waste that cross its scales and the tons of recyclables collected through the 'RECYCLE DELAWARE' program. However, these are not the only means of disposing, recycling or reusing materials. Some waste is disposed of illegally or taken out-of-state for disposal and some recyclables are taken out-of-state to be recycled elsewhere. Other items, such as the number or tons of bottles returned for deposit, are not reported. State law does require all recycling activities to be reported to the DSWA. The Franklin Report often used national recycling rates or assumed a recycling rate for materials where it did not have solid figures. If Delaware intends to make an effort to improve its recovery rates, then the program must include a means to better estimate both solid waste generation and waste recycling or reuse.

### **3.2 Delaware's Recycling Collection Programs**

The primary system for collecting recyclables from Delaware households is the voluntary 'RECYCLE DELAWARE' program run by the DSWA. There are over 130 locations throughout the state where residents can deposit material in "drop-off sites." The standard recycle mix collected at the drop-off sites includes: newspaper, magazines, telephone books; glass bottles; cans; and plastic containers. Some drop-off sites also have special collection of textiles, used oil filters, used motor oil and cardboard. Household batteries from the drop-off sites are collected for proper disposal and not recycled. The recyclable material is transferred to the intermediate processing facility (IPF) in New Castle County where it is prepared for sale.

In addition to the drop-off sites, DSWA collects other materials for recycling in a drop-off program at the three landfill sites and multiple transfer stations. For instance, white goods (refrigerators, washers, etc.), yard trimmings and tires are separated from the waste stream and are not placed in the landfill.

There are several public and private collection programs operating in Delaware. Elsmere, the Arden Area, Wilmington and Camden have existing programs. A test program for recycling collection was completed in Newark, but the program was discontinued. In addition, a private collection enterprise has been initiated by Recycling Express, Inc. It should be noted that these programs are currently subsidized by DSWA. Currently, DSWA does not charge for recyclables delivered to its intermediate processing facility by municipalities or haulers. These programs are discussed below. In addition, the cities of Dover, Georgetown, Rehoboth Beach and Newark collect and mulch leaves and other yard trimmings.

The Town of Elsmere has a curbside collection program where recyclables and bulky items are picked up mid-week and trash is picked up twice a week. Materials collected for recycling are newspaper, magazines, and other household paper. They are taken to DSWA's processing facility. Elsmere collected approximately 50 tons of trash and 1 to 2 tons of recyclable paper every week. The recycling participation rate is about 20 to 25% of the residents. The Town had also collected cans and glass containers at one time, but stopped because of lack of participation. The Town also vacuums up leaves from the street and composts them. This is only for leaves that have fallen into the street; residents are not supposed to rake leaves from their yards into the street.

Nearly five years ago the Arden area (Arden, Ardencroft, Ardentown) began curbside collection of mixed paper, cardboard, clear glass, steel cans and aluminum using a 2-container system two times during a month (no data is available for this program). The City of Wilmington has curbside collection program serving 1,500 households for newspaper only and collects approximately 24 tons per year. The costs for trash and recyclable collection by Wilmington and the Arden area is equivalent to the cost paid for trash collection in Delaware municipalities without the curbside collection program.

The Town of Camden also began a curbside collection program for newspaper on October 1, 1999 after two years of research and one year of working with DSWA. Both television and radio news media promoted the program. Based on the initial survey sheets, only 18 of the 200 participants said they currently recycled. Many residents are now asking to recycle other items. The Town hopes to add to the program this spring. In addition to newspaper, Camden recycles Christmas trees annually by picking them up during the month of January. The newspaper collection program has continued with the assistance of DSWA. The residents also receive one bulk pickup on the last Tuesday of the month when they notify town officials of items. Local resale dealers as well as local appliance repair service shops are notified when items are available. A large number of the bulk items are removed prior to the town's pickup by other individuals.

The City of Newark ran a curbside recycling test for newspapers with 500 households for six months during 1996. Only 765 tons of newspaper were collected versus an expected 1010 tons. The costs of the test were \$183 per ton versus \$129 per ton for trash. A comparison of the weight of newspaper collected by the curbside test to that deposited in the 'RECYCLE DELAWARE' drop-off sites in Newark for the same period of time led the program managers to conclude that most of the curbside collected newspaper would have been deposited in the drop-off sites. This conclusion is consistent with the high

level of newspapers being recycled through the drop-off system throughout the state. Due to the lower than expected collection rate and high cost, the program was discontinued.

Delaware also has one private company that provides a recyclables collection service for households. Recycling Express of Delaware, Inc., currently collects recyclables from 175 residential customers and 100 commercial customers in New Castle County on a biweekly basis. The typical cost for the recyclable collection service is currently \$144 per year in addition to charges the residential customer must pay for regular trash removal. If an entire neighborhood were to contract for recyclable collection services, the cost might be up to 25% lower. There is a sector of the population who is willing to pay for the service.

### **3.3 Delaware's Investment in 'RECYCLE DELAWARE'**

In 1998 the 'RECYCLE DELAWARE' program cost \$137/ton of recyclables or \$0.72/month/household based on 275,000 households in Delaware (note that households do not actually pay this amount – it is spread out over the whole system and is subsidized by DSWA tipping fees). This cost included transportation, processing and marketing of all material collected by 'RECYCLE DELAWARE' and additional materials brought to the DSWA Intermediate Processing Facility (IPF). In addition, DSWA has invested \$3,587,454 in drop-off sites, the IPF and other equipment and spends approximately \$150,000 annually on 'RECYCLE DELAWARE' outreach.

### **3.4 Opportunities to Improve Recycling Rates**

The survey and the Work Group's other research pointed to clear opportunities to increase the State's recycling and diversion rates. Participation in recycling is affected by awareness. For example, 'RECYCLE DELAWARE' centers take both magazines and telephone books. However, only 21% of those that currently recycle include magazines and only 10% include telephone books in their recycled materials delivered to drop-off centers. When asked what they would like to recycle, the same set of people responded with 42% magazines and 32% telephone books. In other words, people who currently recycle are unaware that 'RECYCLE DELAWARE' centers accept magazines and telephone books. See Table 4 for additional opportunities. In addition, survey results show that 15% of those that don't currently recycle don't know how and two-thirds of the people who don't recycle are also unaware of the 'RECYCLE DELAWARE' drop-off centers. Delaware can increase its current recycling rate to some degree by increasing awareness of its current recycling opportunities.

**TABLE 4: Recycling Opportunities Per Survey Response**

<b>Recyclable</b>	<b>Current Rate per Survey</b>	<b>Would Like to Recycle</b>
Plastic	63	74.3
Glass	67.4	67.7
Newspaper	67.9	62.7
Aluminum	74.3	43.1
Magazines	20.7	41.5
Cardboard	11	35.1
Tin Cans	32.5	33
Telephone Books	10.3	32.4
Corrugated Boxes	11.3	29.8
Motor Oil	17.6	23.5
Yard Waste	3.4	21.1
Textiles	8	20.4

KEY: Gray shaded areas indicate where awareness could result in an increase in recycling rates.

Increasing the number of 'RECYCLE DELAWARE' locations will also increase participation in recycling according to the survey. For Delawareans who were aware of 'RECYCLE DELAWARE', 28.7% found locations to be inconvenient and 3.8% weren't aware of a location near them. Fifteen percent of Delawareans who already recycle stated they would recycle more if there were more convenient drop-off locations, 14% if there were more collection centers and 7% if there were drop-off sites near shops. Thirty-seven percent of Delawareans who don't currently recycle but would like to would recycle if the drop-off locations were more convenient, 14% if drop-off sites were near shops and 10% if there were more collection centers.

The U.S. Environmental Protection Agency report "Cutting the Waste Stream in Half: Community Record-Setters Show How (June 1999)" found that communities with the highest recycling levels recover yard waste and mixed paper. The survey asked Delawareans who already recycle what else they would like to recycle. Few mentioned mixed paper and 21% mentioned yard waste, especially the New Castle County respondents. Cardboard, or paperboard, was frequently mentioned with a 35% response.

Implementing curbside collection for recyclables and pay-as-you-throw for trash collection has also been shown nationally to increase recycling rates. These options are discussed in Section 4.4 – Strategies Used by Communities to Reduce the Costs of Recycling.

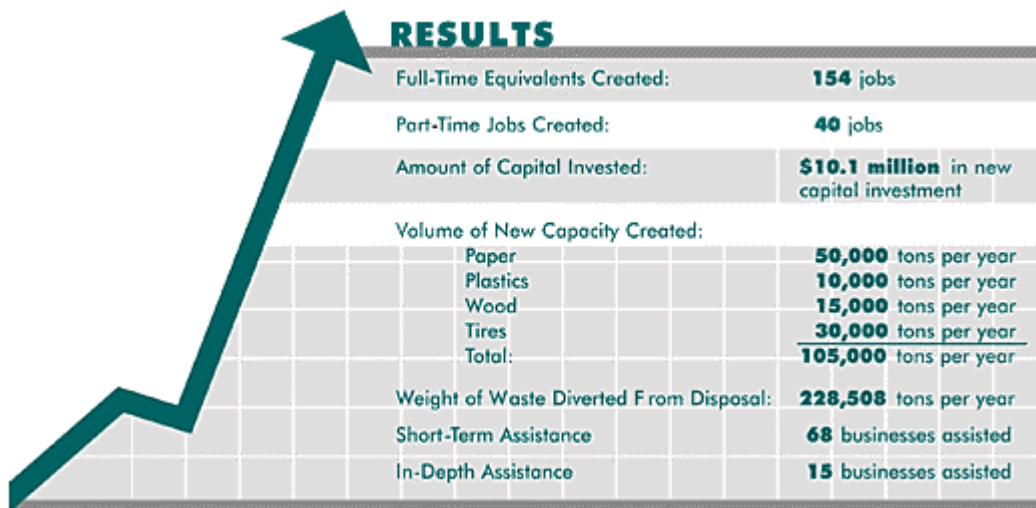
### 3.5 Delaware's Green Industries Program

A key component to the recycling lifecycle is developing markets to process or use recyclable materials. The Delaware Economic Development Office's (DEDO) Green Industries Office serves approximately 172 Delaware companies, who are engaged in an economic activity that is directly related to the collection, consumption and/or processing of recyclable materials. These companies rely on the Office for technical and marketing assistance, as well as the identification of financing opportunities for business expansion or relocation.

This constituency represents approximately 2,034 jobs with annual an payroll of \$55,428,000 and estimated receipts totaling \$466,348,000 (Northeast Recycling Council U.S. Recycling Economic Information Study, February 2000).

The Office's primary mission falls under the Green Industries Initiative, which is a joint effort between DEDO and DNREC to promote the use of recycled materials and a reduction in waste generation within Delaware's manufacturing sector. The initiative targets specific businesses for receipt of technical and financial assistance to further the goals of Governor Castle's Executive Order #82 and Delaware's Pollution Prevention Program.

**FIGURE 1: Past Performance of the Green Industries Office**



## **4.0 Benefits and Costs to Delaware of Recycling**

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### **4.1 Economic, Financial and Social Benefits of Recycling**

Today, efficient industries, plants and businesses practice recycling of materials which they simply discarded a decade or two ago. Manufacturing processes often generate by-product streams of single homogeneous materials, and those materials frequently are relatively free of contamination and often free of highly hazardous components. It makes sense economically – as well as environmentally – to recover value from those streams instead of simply discarding them. “Zero waste” has recently become a stated objective of some businesses.

Solid waste generated by a municipality is constantly changing in composition and is contaminated with small amounts of hazardous or noxious materials. There are large quantities of recoverable and reusable materials in municipal solid waste, but lack of a single national “best approach” to their separation, recovery and reuse has inhibited the recycling progress. The best approach depends greatly on specifics of municipal situations. And it costs money.

Not recycling costs money too, but most of these costs are in the future and not obvious. Some businesses have difficulty quantifying benefits to recycling their wastes. And some also – for the very long-term health of their business – must incur costs today that will not pay off for decades or generations. For example, U.S. forest product companies have massive tree planting expenses (investments) every year, though the trees won’t be harvested for 20 years or more.

Counter examples include actions of some municipalities in the United States and elsewhere to allow draw down of groundwater aquifers to satisfy “needs” of the moment, ignoring their responsibility to future landowners and businesses who will end up competing for the dwindling and ever more expensive supply in years ahead. Another example is global “draw down” of world fisheries at rates faster than natural reproduction can replenish.

Benefits to recycling have real economic value, but are hard to quantify financially. Yet in spite of the inability to provide precise dollars-and-cents quantification of those benefits, it is important to at least identify them. The Table 5 is the Work Group’s identification of the types of benefits that increased recycling provides to individuals, to the community, to Delaware – and to future generations.

**TABLE 5: Benefits of Recycling Components of Household “Trash”**

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- Reduce consumption of non-renewable sources of energy and raw materials - This is an ethical and moral issue: *Does this generation in general, and this nation in particular, have the right to waste the world's non-renewable resources?* Natural processes do not regenerate “non-renewable” resources in times comparable to human lifetimes. Such materials include for example natural gas and oil used for energy, and ores from which steel, aluminum and other materials of commerce are produced. These materials will gradually but inexorably rise in cost and perceived value as the supply gradually diminishes. This is a huge issue and involves responsibilities of individuals and nations that, by today's world standards, possess great wealth. Supplying industry with recycled materials, rather than "virgin" resources extracted from forests and mines, is environmentally preferable because it saves energy, reduces emissions of greenhouse gases and other dangerous air & water pollutants, and because it conserves scarce natural resources. In 1996, Delaware recycling programs supplied industry with over 207,000 tons of scrap commodities like paper, glass, metals, plastics, wood, construction & demolition and other materials. Recycling reduces the need for landfills and other disposal facilities, thereby allowing local lands to be used in more environmentally preferable ways. And, by substituting scrap materials for the use of trees, metal ores, minerals, oil and other virgin materials, recycling reduces the pressure to expand forestry and mining production. By recycling nearly 75,000 tons of scrap metal in 1996, Delaware recycling efforts reduced the need for virgin materials by twice that amount, including 93,600 tons of iron ore, 52,400 tons of coal and 4,400 tons of limestone.
- Reduce environmental damage from industrial waste - Recycling of household trash actually can reduce industrial waste. Consider: potentially recyclable material – glass, metal or plastic – that ends up in a landfill is replaced by new material whose manufacture may generate additional unwanted by-products. Some of these by-products may be environmentally undesirable – some even toxic to humans and other living species. On the other hand, re-manufacture beginning with recovered, recycled material can be inherently "cleaner". For example, it is environmentally preferred to collect, remelt and reuse aluminum from soda cans than to dig more bauxite from mines and process it through today's environmentally-polluting process for manufacture of additional aluminum metal.
- Reduce environmental damage from residential and commercial waste - Residential and commercial waste causes environmental damage also. The list of hazardous materials that are discarded by homeowners is lengthy. It includes mercury in fluorescent light tubes and batteries, chlorinated cleaning solvents, heavy metals on old electroplated fixtures and as additives in PVC and other plastic materials, oil from automobiles, etc. In addition to greenhouse gases, recycling can reduce a range of pollutants from entering the air and water. This benefit accrues again because of reduced fossil fuel use and because recycled materials have already been processed once. But it also accrues because recycling keeps materials out of landfills, where they can introduce leachate into groundwater systems, and out of incinerators, which can emit pollutants into the air and into ash residue. Recycling has been shown to produce less of 27 different types of air and water pollutants, compared with using virgin materials in manufacturing and disposing wastes. In 1996, Delaware recycling efforts resulted in reductions of as much as 641 tons of water pollutants and 8,800 tons of air pollutants (not including the greenhouse gas reductions mentioned above). Recycling reduced overall emissions of sulfur oxides, an important ingredient in acid rain formation, by about 1,000 tons, and reduced nitrous oxides by an additional 1,000 tons, an amount equal to nearly 6% of all such emissions from electrical utilities in the state.
- Extend life of municipal landfills - This postpones the need to fund purchase and development of new landfill sites – as well as social and political conflicts accompanying selection of a new

site. It also reduces the pressure for incineration as a landfill alternative. For example, the DSWA landfills today receive about 2,700 tons per day of trash and have an average remaining lifetime of 15-20 years. If 60,000 (25% of the residential waste stream) tons of reusable materials are recycled each year for the next 15 years, thereby diverting this material from the landfill, it would result in a 10-15% increase in landfill life.

- Provide jobs - Nationally there are many established jobs and small businesses supported 100% by the recycling business. Studies reveal that recycling, reuse and other materials-efficient practices generally create more, and more sustainable, employment. One example is Delaware's "Green Industries" program, which has helped to create 154 full-time and 40 part-time jobs since its inception in 1995. Recycling provides jobs in collecting, sorting, packaging, cleaning, processing and reselling products based in whole or part on recycled material. On average, pay is better than for jobs involved in collecting, transporting and landfilling waste. For every 100 jobs created by recycling, only 13 jobs are lost in the solid waste collection and disposal and in virgin materials extraction.
  - Satisfy a "waste not" ethic - Many members of the generation that personally experienced scarcity of commodities and necessities in the depression years – the decade of the 1930s – have a strong natural aversion to throwing away materials that others might find to be useful.
  - Teach environmental values to individuals - Wasteful use of non-renewable resources, coupled with indiscriminate disposal of products made from those resources, teaches the wrong message – especially to our youth. As the world's population increases, and natural resources are used at a faster rate, strong and informed leaders will be needed to create a balance.
  - Reduces emission of greenhouse gases - On a per capita basis, the U.S. generates the largest emissions of greenhouse gases, those gases that cause earth temperatures to rise. Many scientists believe that if not slowed, the present rate of global climate change can have near-irreversible and disastrous consequences for the earth's entire ecosystem. By reducing the amount of energy used by industry, recycling also reduces greenhouse gas emissions and helps stem the dangers of global climate change. This is because much of the energy used in industrial processes and in transportation involves burning fossil fuels like gasoline, diesel and coal -- the most important sources of carbon and other greenhouse gas emissions into the environment. Delaware recycling efforts in 1996 reduced greenhouse gas emissions by about 64,000 tons carbon equivalent per year, equal to about 2.1% of all industrial carbon dioxide emissions in the state.
  - Save Energy - Energy savings may be the most important environmental benefit of recycling, because using energy requires the consumption of scarce fossil fuels and involves emissions of numerous air and water pollutants. The steps in supplying recycled materials to industry (including collection, processing and transportation) typically use less energy than the steps in supplying virgin materials to industry (including extraction, refinement, transportation and processing). But most energy savings associated with recycling accrue in the manufacturing process itself, since recycled materials have already been processed at least once. For example, it takes 20 times the energy to make virgin aluminum, 8 times the energy to make virgin plastic, and twice the energy to make virgin paper than to produce their recycled equivalents. The 128,000 tons of paper, glass, metals and plastic Delaware recycled in 1996 saved a total of about 2.2 trillion BTUs of energy, equal to nearly 2% of all energy used by industry in the state, or enough to power over 11,000 homes.
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## **4.2 Cost of Expanding Recycling in Delaware**

Due to the multitude of parameters that drive the costs of a residential recycling program, it is difficult to *correlate* the costs of various programs currently operating across the country to Delaware with a high degree of accuracy. Program design, frequency of pick-up, types of materials collected, systems used to process recyclables, proximity of end-markets, and labor costs are just a few of the variables that impact the cost of establishing a recycling program.

The Work Group's Cost Subcommittee gathered information from a variety of sources to identify the costs associated with individual components of a recycling program. The information presented is based on the experience of residential recycling programs operating in Delaware, as well as cost estimates reported by recycling professionals in other states.

Delaware's single largest barrier to implementing a curbside collection program that includes all the items currently collected by 'RECYCLE DELAWARE,' and meets the survey requirements of cost and sorting, is the lack of any material recovery facilities (MRFs) within the state. In order to provide curbside collection of the same types of materials currently collected by 'RECYCLE DELAWARE' drop-off centers, commingling of recyclables would be required. The materials would then have to be separated, either at a MRF (such as the one developed by the City of Phoenix at a cost of \$12-\$16 million) or at the curb by the hauler. Separation of materials from curbside containers into a truck would cause a significant increase in collection expenses, including additional staff time required and special trucks needed to keep the materials separated. A private firm provides this service in Delaware and currently charges \$12 per month. This service is for recyclables only and the charge is in addition to charges for regular trash pick-up.

When reviewing the costs of the various curbside recycling programs operated in Delaware by municipalities or private haulers, it should be noted that the cost of recycling these materials is currently subsidized by DSWA. Currently, DSWA does not charge for recyclables delivered to its intermediate processing facility by haulers or municipalities. However, it should be noted that if a recycling program was instituted that significantly increased the volume of materials processed by DSWA, the Authority would need to consider levying a tipping fee on those materials. Additionally, with an increase in the amount and types of recyclables delivered, the Authority may have to enhance its processing capabilities through capital and human resource investments.

Based on recycling programs in communities across the country, the Subcommittee summarized several strategies used by top performing communities to reduce costs and increase the revenue generated by recyclables. Two strategies which have the potential to provide the greatest impact on reducing the cost of providing recycling and trash collection services are volume-based trash collection fees (Pay-As-You-Throw), which has been adopted by dozens of communities across the country, and cooperative (group) contracting by municipalities or community groups on behalf of their residents.

Much of the cost data presented in this report is centered on residential curbside collection of recyclables. The reader should keep in mind that 25% of Delawareans do not

have curbside trash removal services. These individuals either self-haul or live in multi-family housing units served by dumpsters. Thus, a curbside recycling program may not be a feasible solution for these individuals.

It is important to understand the existing collection practices for different materials throughout the State as new collection programs may be competing for the same materials as 'RECYCLE DELAWARE'. Table 6 contains targeted tons based on population, collected tons based on actual data from DSWA records, and an estimated diversion rate from the Residential Solid Waste Stream. Statewide, 'RECYCLE DELAWARE' is collecting 38% of targeted newspaper. This percentage compares favorably with newspaper collection in other states' programs. In Sussex County, the estimate for newspaper collection is 53%. Therefore, adding new local program for newspaper in Sussex County might increase overall collection, but the operation costs of both the RD program and the local program may be affected and decrease overall efficiency. In general, this conflict also applies to the other two counties and possibly to other materials that may be considered.

'RECYCLE DELAWARE' participation in Sussex County seems to be greater than the other two counties as shown in Table 6 based on total recyclables and paper. This may be due to the location of the Drop-off sites in the county. However, it may also be due to the fact that many Sussex households do not have garbage removal services and take their garbage directly to a local transfer station or the landfill, which have 'RECYCLE DELAWARE' drop-off sites.

**TABLE 6: 'RECYCLE DELAWARE' - 1998**

		Recycles		Paper	
		Tons	Diversion Rate	Tons	Diversion Rate
<b>Statewide</b>	<b>Targeted</b>	74,000		32,300	
	<b>Collected</b>	17,147	23%	12,400	38%
<b>New Castle Co.</b>	<b>Targeted</b>	48,000		21,000	
	<b>Collected</b>	10,000	21%	7,300	36%
<b>Kent Co.</b>	<b>Targeted</b>	12,000		5,200	
	<b>Collected</b>	2,400	21%	1,700	32%
<b>Sussex Co.</b>	<b>Targeted</b>	14,000		6,000	
	<b>Collected</b>	4,700	33%	3,200	53%

If the 'RECYCLE DELAWARE' program were expanded to include more materials, or if a curbside recyclable collection program were instituted, it will be necessary to expand

the processing capabilities of the current intermediate processing facility located in New Castle County or a new public or private facility may be built. The extent and cost of the upgrades to the facility would largely depend on the estimated quantity of material delivered, types of materials targeted for curbside collection and whether the recyclables would arrive at the facility pre-sorted or commingled. A large targeted mix of commingled recyclables would require the most extensive upgrades, whereas a smaller mix of source separated materials would require less extensive upgrades. Based on information provided from Arizona, costs could range from \$6 to \$12 million to build a state-of-the-art facility capable of separating all of the commingled materials in Delaware. Depending upon the design of the curbside program, costs may be borne by haulers at the point of collection if new compartmentalized trucks are used to sort materials, or at the processing facility where a range of processing equipment could be used to sort recyclables. Subsequently, these costs may be borne by the customer.

### **4.3 Cost of Recycling in Other States**

Curbside collection programs and recycling experiences vary from state to state and city to city and so do the costs associated with the programs. The cost of curbside recycling is \$2.53/month for the average household in 13 of the high diversion areas listed in EPA's "Cutting the Waste Stream in Half." The program costs in these cities vary from \$1.24 to \$5.04/month/household and are contract-driven rather than market-driven. These values from EPA's document are summarized in Table 7. Waste collection of recyclables, yard waste, and trash in high diversion towns averages about \$145 per year. These costs were the same or slightly higher prior to starting the composting and recycling programs. Although similar in range to the cost paid by households in Delaware municipalities listed in Table 10, the smallest high diversion town from Table 7 has 2,790 households and the largest has 248,970. Thus, it may be valid to compare these costs to those expected in similar size Delaware municipalities.

The City of Salisbury, MD currently contracts its residents' recyclable collection at \$2.85 per month per household. It is not known whether Salisbury charges an additional administration fee. In 1996, Newark, DE received a quote of \$2.16 per month to pick up their residents' recycle material. Both cities have about 8,000 households which is well above the minimum 1,000 households and optimum 5,000 households that 2 waste hauling companies consider optimum for a curbside collection program.

Based on this information, a cost for curbside collection in Delaware of \$2 to \$3/month/household may be reasonable to expect. Based on the results of the survey commissioned by the Work Group, an additional cost of \$2 to \$3 per month per household would be unacceptable to the majority of Delaware residents unless a compensating reduction in trash cost can be achieved as was the case in all of the high diversion areas investigated.

**TABLE 7: 1996 Residential Solid Waste Costs in High Diversion Towns**

City, State	Curbside Collection Frequency	# of Households	Recycle Cost	Compost Cost	Trash Cost	Total Cost
			\$ per household per month			
Chatham, NJ	2 Weeks	2,790	1.46	4.35	13.17	18.98
Falls Creek, VA	Weekly	2,928	3.17	6.07	8.69	17.93
Crockett, TX	Weekly	3,293	1.94	1.74	2.05	5.73
Fitchburg, WI	Weekly	3,860	3.15	1.48	4.38	9.01
Dover, NH	Weekly	11,000	2.06	0.33	3.65	6.04
Loveland, CO	Weekly	16,422	2.00	1.77	3.36	7.12
Bellevue, WA	Weekly	23,372	5.04	4.87	9.72	19.64
Clifton, NJ	3 Weeks	29,300	0.99	1.52	12.30	14.81
Ann Arbor, MI	Weekly	46,000	1.96	1.00	3.51	6.47
Worcester, MA	Weekly	50,868	1.24	1.02	4.01	6.27
Madison, WI	Weekly	57,949	3.12	2.85	8.60	14.57
Portland, OR	Weekly	129,700	4.14	1.47	11.96	17.57
Seattle, WA	Wk to Mo	248,970	2.62	1.86	8.43	12.91
Average Cost	Curbside		\$2.53	\$2.33	\$7.22	\$12.08
Leverett, MA	Drop-off	650	0.95		3.45	4.40
Igloos, DSWA	Droo-off		0.72			

Successful recycling programs are listed by type in Table 8. For comparison to the 'RECYCLE DELAWARE' program, a drop-off only program is included. As expected, drop-off programs are typically less costly than other types of programs.

**TABLE 8: Other Community's Recycling Programs vs. Delaware**

	# of Households	Type of Program	Participation Rate Percent, %	Diversion Rate, % Product/Yard Waste	Recycle Cost \$/ton	Trash Cost \$/ton
Leverett, MA	650	Rural DO	NA	30 / 23	34.30	91.00
Crochett, TX	3,293	Rural C	80	20 / 32	181.90	62.41
Chatham, NJ	3,285	Sub. All	80	22 / 43	38.72	157.00
Dover, NH	11,315	City C, DO	74	35 / 17	74.69	114.58
Ann Arbor, MI	46,000	Urban All	93	29 / 23	95.42	85.58
Worcester, MA	63,588	Urban C	NA	27 / 27	54.06	96.00
Phoenix, AZ	317,000	Urban C	80	19 / --	NA	NA
State of Delaware	275,000	Varies DO	49	12 / 2	137.00	203.00
Abbreviations:	C=curbside	DO=drop off	PU=Pickup	All = C, DO, & PU		

A combination of drop-off stations, curbside programs, composting and volume-based trash fees are being used to achieve New Hampshire's 40% diversion goal. New Hampshire has 200 drop-off stations throughout the state called transfer stations. These supplement curbside recycling run by NH municipalities. The program run by Dover, NH, is an example of a well run, high diversion program with 35% of product waste and 17% of yard waste from RSW being diverted from the landfill. This program is run at a recycle cost of \$74.69/ton versus a trash cost of \$114.58/ton. The total of these costs is less per household than the original trash cost before the program. However, one should not expect cost to go down with recycling.

Phoenix, AZ, selected 20 materials to target with their curbside program. Because they have a state-of-the-art Materials Recovery Facility (MRF), they are able to provide commingled collection, which limits the amount of separation required by the household. A state-of-the-art MRF, such as the one in Phoenix, AZ, which handles more than 100,000 tons, will cost \$6 to \$12 million. This type of facility does not currently exist in Delaware and it should be further examined. A payback analysis should be performed to examine annual operating costs and to see what time period the initial capital costs could be

recovered. A cost-benefit analysis should be done as well. A greater number of materials could be processed, or more material recovered such that a MRF might be cost effective. During the analyses, several questions will need to be answered including: 1) Who will own, operate, and pay for the facility? and 2) How will no guarantee of flow affect the facility and its efficiency? Such analyses were beyond the scope of the Cost Subcommittee.

Based on the Concord, NH test program, curbside programs should be undertaken only in areas of concentrated households if cost is a primary concern. Based on the Work Group's survey, cost is a concern in Delaware. Information from EPA and other sources show that the most effective programs in terms of participation have mandatory curbside recycling on a local basis or volume-based trash collection fees.

#### **4.4 Strategies Used by Communities to Reduce the Costs of Recycling**

Variations in trash and recyclables management in Delaware may negate a single solution. For example, 25% of the respondents to the survey have no curbside or alley trash pickup. There are many small towns and few urban areas throughout the State. All states have different areas that require different solutions for increased recycling efforts.

**Curbside Recycling:** A curbside recycling program must be customized to fit the community that it serves. There is no single strategy applicable to every situation to produce a cost effective program with a high diversion rate. However, experience has taught recycling officials and community leaders a number of strategies that can often be implemented to reduce the costs of curbside recycling programs, which include:

1. Provide residents with large containers for their recyclables and educate them to put the containers out at the curb only when they are full. This will provide more efficient collection.
2. Consider picking up recyclables every other week (rather than weekly). Again, this will increase collection efficiency.
3. Substitute a recycling pickup for a garbage pickup. This costs less than adding a pickup day. With convenient recycling available, residents should generate less trash and should be able to get by with less frequent trash pickup, particularly if they have twice-a-week pickup. This allows efficient use of trucks and personnel with little or no added cost. This concept could be used in some areas of Delaware. However, there is only one processing facility located in the state so transportation costs will also be a factor for local programs. This method of operation has helped Salisbury, MD adopt recycling with little additional cost.
4. Utilize compartmentalized trucks that can accommodate trash and recyclables at the same time. Picking up trash and recyclables in the same trip eliminates the need for multiple truck trips through the same community.
5. Use large trucks designed to lift containers mechanically and maximize the use of space. The maximum height (and consequently the volume) of non-mechanized

vehicles is limited by the sanitation workers' ability to lift the trash or recyclables containers into the holding compartment. With mechanized lifting, the height of the truck is no longer limited in this way. A larger capacity truck means fewer trips with resulting cost savings.

6. Initially, collect only materials that have a high market value to help offset collection and processing costs (typically aluminum); and as feasible expand the program to include additional materials based on market conditions. In general, it is better to start with a few materials and expand the program as it is not a good idea to drop materials.
7. Find a place to stockpile recyclables. The ability to store materials enables the program take advantage of the most favorable markets.
8. Develop cooperative marketing agreements with neighboring communities. Combining forces with other recycling programs can broaden potential markets.
9. Implement Pay-As-You-Throw pricing for trash disposal. This system gives residents an incentive to reduce and recycle their waste. This translates into savings on disposal (if the municipality provides this service) and a higher recycling rate.
10. Provide drop-off centers in areas where curbside recycling is not practical or to augment curbside programs. Drop-off centers are less costly than curbside recycling. In rural areas or areas without curbside trash pickup, drop-off recycling may be the only reasonable strategy. Drop-off centers can also provide places for people to recycle materials that are not included in a curbside program.
11. Implement source reduction and reuse strategies. This will reduce the quantity of waste being disposed, therefore saving on tipping costs.
12. Develop local markets for targeted recyclables. This will not only save on transportation costs but will also facilitate the customization of the recycling program to ensure that the material being collected is what the end user needs.
13. Provide ongoing education and promotion programs. Continuous outreach is necessary to keep residents motivated and to educate new residents about the program.
14. Determine the number of materials to be collected and their separation method. Currently, materials accepted must be source-separated to be taken to the existing Intermediate Processing Facility. Commingled collection would allow a 2-bin system. However, the material would need to be separated at a new statewide Materials Recovery Facility (MRF).

Yard Waste: Most high diversion municipalities and states have active collection and composting programs for yard waste. Four Delaware municipalities (Newark, Dover, New

Castle and Rehoboth Beach) collect leaves separately for mulching or composting. There is little actual measurement of the amount of yard wastes separated from Residential Solid Waste in Delaware. In addition, many lawn services and homeowners also compost yard waste, but there are no estimates of how much yard waste is being diverted. The advantages of a yard waste program appear to be lower overall collection and processing costs and an increase in the overall diversion rate.

Volume-based trash collection: A different approach to trash collection and payment is volume-based trash collection where a household pays a unit price based on its waste generation, i.e. by the number of bags or containers. Unit based pricing is prevalent in the commercial sector and has been used for years. In the residential sector, this is also known as Pay-As-You-Throw (PAYT) and is currently used by approximately 4,030 communities in the United States. Although this is not recycling, it is a way to encourage households to directly manage their waste. Those who recycle, compost or reduce the materials they buy can reduce their waste disposal costs. PAYT may be a reasonable alternative to mandated curbside recycling or landfill bans. It is being used in many areas across the U.S. PAYT could also be used in conjunction with curbside recycling or a beefed up 'RECYCLE DELAWARE' program.

One of the advantages of PAYT is its versatility. Its effectiveness is not dependent on mandatory recycling or on curbside recycling so long as a means to recycle is available. It also is not dependent on any specific method of trash hauling. Collection by private hauler, pickup by a government entity, or self-hauling by the homeowner are all viable.

There are many ways of implementing PAYT. Some communities provide various sizes of trash cans whereas the homeowner pays one rate for the smallest can, a higher rate for a larger can, etc. Other programs involve the use of bags, which must be purchased by the residents. Still other communities require residents to purchase stickers which must be affixed to the bags of trash that are set out at the curb. In Delaware, people who haul their own trash to a landfill or transfer station are utilizing a PAYT system that consists of purchasing tickets that get punched each time a bag of trash is disposed. The landfills and transfer stations are equipped with 'RECYCLE DELAWARE' centers where recyclables can be deposited at no charge. Therefore, anyone using these facilities has the option of reducing disposal fees by placing all recyclables in the drop-off sites rather than paying to dispose of them.

Many municipalities that provide trash services to their residents have found that implementing PAYT has resulted in significant savings by decreasing the amount of waste being disposed. Reductions of 25% to 45% have been reported. The costs involved in implementing a PAYT system are minimal as there will need to be little or no change in the way the trash is picked up.

Cooperative (Group) Contracting: Based on the Work Group's survey, households in Delaware pay an average of about \$22 per month per household for trash collection. The majority of households in unincorporated areas of the counties must contract for trash service on an individual basis or must take their trash to the transfer station or landfill. When an individual contracts with a hauler, costs are typically more than fees charged by

direct government services or through cooperative contracting units. Table 9 examines costs paid by individuals for trash collection which are as high as \$25 per month per household. In some municipalities, the local government does not provide direct trash service or provide cooperative contracting as is the case in the City of Seaford and the Town of Hartly. If trash service is desired, residents of both municipalities typically contract for it on an individual basis.

Group or community collection service in Delaware is typically provided through a municipality using direct municipal workforce or a contracted workforce. Group collection service contracted for multiple households appear to offer an advantage over individually contracted services with private haulers. (See Table 10 for costs by group.) The Town of Hartly with 43 households is investigating forming its own district to lower costs to each household according to its Mayor.

In Delaware, curbside trash collection is provided one of two ways. Either through a municipality using a municipal or contracted workforce, or contracted between a homeowner and a private trash hauler. More than 50% of Delaware households contract their services directly with a private hauler. In essence, this means that more than 50% of Delaware residents are not represented by a county or municipality for their trash services. This fact presents a significant challenge if a countywide curbside recycling program were to be implemented in Delaware, or counties were required to meet waste diversion goals set by the state. This dilemma has been overcome in other states by establishing franchise districts, which provides counties or towns with the authority to provide trash and curbside recycling services to its citizens or to contract for trash and recycling services on behalf of its citizens. The Cost Subcommittee has found that the cost of trash collection service is less in communities which have the ability to negotiate trash and recycling services for their residents than in those communities where the individual must negotiate. The most relevant example of this disparity can be seen within Delaware's borders by comparing the cost of trash collection service for individuals and groups as discussed in Section 4.4 Strategies to Reduce the Costs of Recycling.

**TABLE 9. Individual Trash Contracts**

<b>Individual Basis</b>	<b># Trash Pickups/Wk</b>	<b>Cost/Mo/Household</b>
New Castle County, Suburban	1-2	18.00 - 27.00
Kent County, Rural	1	21.00 - 25.00
Kent County, Town of Hartly	1	24.87
Sussex County, Rural	1	19.00 - 23.00
Sussex County, City of Seaford	1	18.00 - 23.00

Based information in Table 10, the Town of Georgetown offers trash service to its residents at one of the lowest municipal rates in the state. Its charge is an average of \$6.67 per month. Conversely, the City of Milford has one of the highest rates at \$16.50 per

month. Comparison of group service is not possible to variances in the number of households served, average house spacing, the number of regular pickups, and the number of bulk item pickups. However, when comparing Table 10 and Table 9, the advantages of group contracting versus individual contracting are evident.

**TABLE 10: 1999 Cooperative Contracting Trash Collection Costs**

<b>Bargaining Group by County</b>		<b># Trash Pickups/Wk</b>	<b>Cost/Mo/ Household</b>	<b># of Households</b>
Kent Co.	Kent County Trash Districts*	2	14.13	5,702
	Camden***	2	13.00	717
	Clayton	2	13.00	465
	Felton	1	10.00	247
	Harrington	1	11.70	912
	Milford**	2	16.50	2,405
	Smyrna	2	15.00	1,777
New Castle Co.	Newark	2	13.00	7,469
	Arden Area***	2	13.70	464
	Wilmington***	2	12.80	28,585
Sussex Co.	Georgetown	1	6.67	1,252
	Rehoboth Beach	2 1 (mid Jan – mid Apr)	9.16-10.41 Seasonal/ Yr. Round	670
* Kent County has 62 trash districts as of December 1999. Kent County does not have trash service in all areas of the County.				
** Milford is actually located in Kent County and Sussex County				
*** Costs for Camden, the Area (Arden, Ardencroft, Ardentown) and the City of Wilmington include existing curbside collection programs for paper.				

Difficulties in comparing programs by group extend to obtaining costs passed on to the individual household. Some local governments do not break out trash costs on a line item basis in property taxes. The fee is often included in property taxes with charges for other services such as police. Other local governments have also increased the number of residential customers by providing trash service outside of local boundaries. The City of

Dover has its own trucks and personnel for trash collection service. The City of Dover does not break out trash service as a line item for its residents. However, it does provide service outside of city limits for \$12 to \$14 per month per household depending on customer location.

Kent County Levy Court currently offers its residents trash service when a trash district is formed. At the present time, there are sixty-two trash districts covering 5,702 households (14% of Kent County's households). Kent County uses the contracting power of its districts to periodically solicit bids and obtain contracted service from a private hauler. Homeowners within the districts currently pay approximately \$14 per month (\$169.60 per year) for twice-a-week pick-up. About \$18.80 of the annual fee is an administrative fee for Kent County to run the program. Potentially, the technique of group or cooperative contracting could be used in other areas.

Cooperative contracting as a cooperative might be done by homeowner's associations and civic groups or by forming franchise districts similar to Kent County trash districts. Those living in areas where franchise districts are feasible could see a substantial reduction in their monthly bill by forming a district or cooperative contracting unit and might add curbside collection of recyclables for well under their current rate.

Cooperatives may not be feasible in all areas due to density. A minimum number of 25 contiguous homes is required by Kent County to form a district based on collection efficiencies. It is important to keep homes contiguous and close due to economic feasibility issues. Farms and businesses are exempt from Kent County districts. Sometimes the farm exclusion makes it difficult to place all homes in a district as some areas will not have 25 contiguous homes within a reasonable collection area. However when looking at curbside collection of recyclables only, haulers are looking for a minimum group size of 1,000 customers and for 5,000 customers optimally.

A disadvantage of group service is that it may put the small private hauler out-of-business as they may be unable to compete with larger haulers for contracts. However, the additional cost for recycling services may be unacceptable in some areas unless trash costs can be lowered per the Work Group's survey responses on cost tolerance.

Most high diversion municipalities have an active collection and composting program for yard waste. Some Delaware municipalities collect leaves separately for mulching or composting. There is no actual measurement of the amount of yard wastes separated from Residential Solid Waste. In addition, many lawn services and homeowners also compost yard waste, but there are no estimates of how much yard waste is being diverted. The overall benefit of a composting appears to be the benefit of lowering overall cost per ton diverted.

## **5.0 Recommendations**

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### **5.1 Initial Recommendations**

Keeping Delaware's current solid waste infrastructure and the survey results in mind, the State should implement a number of steps in this legislative session. The first steps can increase residential solid waste recycling up to a maximum of 25%:

1. Create an Office of Recycling within DNREC to promote and monitor all recycling efforts within the state. A Recycling Public Advisory Council should also be established to assist and advise the Office;
2. Establish a voluntary statewide residential solid waste diversion goal of at least 25%;
3. Establish a statewide education program on recycling within the Office of Recycling;
4. Provide funding for grants to encourage communities, counties and municipalities to implement measures (e.g., curbside collection, pay-as-you-throw) to increase recycling;
5. Make it easier for the Delaware Solid Waste Authority to site 'RECYCLE DELAWARE' collection centers;
6. Enact a State Recycled Products Procurement Law;
7. Enforce Bottle Bill;
8. Develop and publish a list of local companies who currently have products made from recycled materials available;
9. Increase the number of igloos at 'RECYCLE DELAWARE' drop-off sites;
10. Review Report on Executive Order No. 82; and
11. Support and Expand Recycled Materials Markets

### **5.2 Office of Recycling, Diversion Goal, and Recycling Public Advisory Council**

Create an Office of Recycling within DNREC to promote and monitor all recycling efforts within the state. The legislation creating the Office of Recycling should set a statewide residential solid waste diversion goal (25% to 40%), provide General Funds to support staff positions and cover operating expenses, and establish a grant program for communities to implement initiatives to meet the diversion goal. A Recycling Public Advisory Council should be established to assist the Office of Recycling in promoting recycling in Delaware.

The Recycling Public Advisory Council should advise the Office of Recycling on all aspects of recycling; review the Office's Annual Report to the Governor's Office; develop grant criteria and select applications; review of benchmark information and recycling levels provided by DSWA.; advise the Office on how to estimate diversion and determine what needs to be done to improve diversion estimates; and advise the Office on outreach. The Work Group recommends that the following organizations be invited to seat a representative on the Recycling Public Advisory Council:

1. The Governor's Office Environmental Liaison to serve a Chairperson;
2. One county representative to be selected by the Delaware Association of Counties with a suggested rotation among the counties every two years;
3. One municipal representative to be selected by the League of Local Governments with a suggested rotation among the counties every two years;
4. One recycling industry representative to be selected by DNREC with a suggested change in represented company and industry every two years;
5. One waste hauler representative, active or retired, to be selected by DNREC with a suggested change in represented company and industry every two years;
6. Two environmental representatives, with each from different citizens groups to be selected by DNREC with a suggested change in represented groups every two years;

The Group further suggests that the terms of the representatives be staggered so that the entire membership does not change every two years. Individual representatives may retain membership for more than two years if their appointing organization (in the case of 1 and 2, above) re-appoints them or if DNREC cannot find another appropriate representative willing to fill the slot.

The role of the Office of Recycling would be to promote recycling initiatives to community, municipal and county leaders. The Office staff would work with communities, local governments and haulers to help them determine a recycling program design that they believe will best suit their needs and budget. Recycling initiatives should include, but are not limited to, curbside collection, pay-as-you-throw and composting. The Office staff would also help design information campaigns, participate at public meetings on proposed programs, help develop grant applications for the Local Recycling Assistance Program, and work with DSWA and DEDO to identify markets for recyclable materials.

Measuring the amount of residential solid waste generated in each community and the amount that is diverted will be difficult; suggesting a means is best left to the Office of Recycling. It has been done in other states and can be done here. We suggest that the State use the estimates for residential solid waste published in the 1999 Franklin Report as the baseline. The reduction rates would be based on a per capita estimate. Legislation will be needed requiring haulers to report to DSWA the quantities and disposal locations of all residential trash that they collect in Delaware. Legislation will also be required to report any recyclable materials collected within the state for the purpose of recycling to the Office of Recycling and must include enforcement and penalty provisions. Without this information, Delaware will not be able to estimate its diversion rate.

The Work Group recommends the creation of 5 positions in the Office of Recycling. One position, responsible for the outreach program, has already been described. The remaining four positions should consist of: a **technical support person** to help counties/municipalities develop, implement and improve programs; a **management analyst** to collect and review recycling reports, prepare an annual report to the Governor and General Assembly and manage grants; an **administrator**; and **clerical support**. The cost of all 5 staff positions for FY 01 is \$219,657. Operating costs, including the outreach budget, is

estimated at \$165,500 for FY 01. Although not charged with developing funding options, the Work Group recommends that none of the funds allocated for the new staff positions and the operation of the Office of Recycling come out of DNREC's current operating budget or be allocated to the Office of Recycling in lieu of funding another DNREC program.

### **5.3 Statewide Education Program on Recycling**

A key component of the Office of Recycling must be a statewide recycling education and outreach program regardless of which diversion goal is selected. The survey results strongly indicate that awareness of recycling opportunities has a direct relationship to participation in recycling. Establishing a statewide education program would require the establishment of an outreach position and at least \$100,000 annually in contractual funds within the Office of Recycling. Contractual funds would be used to reach Delawareans through radio and television advertisements, newspaper articles and editorials, school programs, mailers, and web sites. The outreach position would also contact civic associations, local government officials and waste haulers about recycling initiatives – the idea being to involve all stakeholders. The outreach message should cover all recycling opportunities, such as returning bottles for deposit, use of 'RECYCLE DELAWARE' drop-off sites, the means for recycling bulky items such as white goods and tires, plastic grocery bag collection at grocery stores, composting at home, mulching by DSWA, private industries and municipalities, and private collection services. Other recycling messages, such as reduce, reuse, "buy recycled" and the composting services of the Delaware Composting Association and Master Gardeners should also be included. All efforts to promote DSWA's services would be coordinated with DSWA (DSWA currently spends approximately \$150,000 per year on 'RECYCLE DELAWARE' outreach). The outreach effort would also emphasize the importance of buying recycled and environmentally preferable products.

The outreach program should also explore sponsorship for the collection of recycles at major events. Thousands of cans and bottles are thrown away during major events such as the State Fair and the Pumpkin Chunkin'. Groups looking to raise funds for their organization should be enlisted to collect and redeem these items during or after the event. The success of this approach should be measured in terms of the educational component's value rather than in terms of the recycles collected.

### **5.4 Community and Local Government Grants**

The Office of Recycling and the Recycling Public Advisory Council would develop criteria for providing grant funds to communities and local governments to develop reduction, reuse and recycling programs. The Work Group recommends that \$500,000 dollars annually be allocated for this purpose. The Office and Council would also be responsible for developing criteria within the first year of the program on how to measure waste diversion, what items are to be included in the measurement, how to report diversion, and how to verify figures reported within the first year of the program.

## **5.5 Siting of 'RECYCLE DELAWARE' Drop-Off Centers**

Make it easier for the Delaware Solid Waste Authority to site 'RECYCLE DELAWARE' collection centers. Since 'RECYCLE DELAWARE' will be the primary focus for collecting a large percentage of these materials, the State should take steps to make it easier for DSWA to site drop-off centers. See Appendix F for a bill that will require all new or expanded retail stores, state offices, schools, apartment complexes and housing developments to provide space for 'RECYCLE DELAWARE' centers should DSWA decide there is a need for them in the area. DSWA would provide their input on where 'RECYCLE DELAWARE' centers are needed through local planning agencies.

## **5.6 State Recycled Products Procurement Law**

Enact a State Recycled Products Procurement Law. Although procurement is beyond the scope of Executive Order No. 60, it became evident to the Work Group in the course of its deliberations that this issue is a vital component of the recycling lifecycle. In order to stimulate the manufacture of new products from the materials collected in the state's recycling programs, promote the establishment of Green Industries within Delaware, and create new employment opportunities, there has to be a market for goods made from recycled materials. The federal government and many states and progressive corporations have "buy recycled" policies in place. According to the report "Greening the Government: A Guide to Implementing Executive Order 12873," at least 45 states, the District of Columbia, and more than 500 local governments have established legal requirements to purchase recycled content products. The Work Group recognizes the immense purchasing power of the State and its ability to influence the production of recycled content products. Furthermore, the Work Group believes the State should take a leadership role in the purchase of recycled content goods to set an example for both its citizens and the commercial sector. The U.S. Environmental Protection Agency has developed recycled product procurement guidelines, which could be used by the State as a starting point for developing its own guidelines. An example can be found in Appendix F. An initial draft of legislation to implement this recommendation can be found in Appendix F. Also, in its leadership role, the state should especially encourage counties, local governments, manufacturing sites, commercial establishments and non-profits to follow EPA recycled procurement guidelines.

## **5.7 Enforce Bottle Bill**

The Work Group believes the Beverage Container Law is an important part of an integrated recycling program and should not be repealed. We recommend that the Office of Recycling at DNREC be responsible for increasing the public's awareness of bottle redemption opportunities. In addition, DNREC should be provided with an additional \$20,000 per year to conduct a pro-active compliance monitoring and enforcement program.

## **5.8 Product Supply List**

Enacting a State Recycled Products Procurement Law is only one step in closing the loop on recycling. The State should encourage local governments, private entities and individuals to buy recycled. This should be a message of both DNREC's Office of Recycling and the Delaware Economic Development Office's (DEDO) Green Industries program. As demand for recycled products is created, private interests will fill the need creating a local market for the recycled materials generated in Delaware.

The DEDO should compile a list of local companies who currently sell recycled-content products. The list should be posted on the Internet and made available in hard copy. Approximately \$20,000 will be required to print and distribute the list.

## **5.9 Increase the Number of Igloos at 'RECYCLE DELAWARE' Drop-Off Sites**

Delaware can increase its recycling rate by adding new materials to the mix. The Work Group recommends that as new markets for recyclables develop DSWA add igloos for as many recyclables as economically feasible, with paperboard, white paper and junk mail being a high priority. The Work Group understands that space may limit the availability of all igloos at all 'RECYCLE DELAWARE' sites.

## **5.10 Review Report on Executive Order No. 82**

Former Delaware Governor Michael N. Castle signed Executive Order No. 82 in July 1990 which included 18 charges to various state agencies to encourage source reduction, recycling and waste utilization (See Table 1). The State's Site Materials Management Team prepared a report in March 1998 entitled "An Evaluation of Executive Order #82 – Statewide Recycling Program Signed on July 24, 1990." The Recycling Public Advisory Council should review this report to determine if state agencies have or are implementing the Executive Order and make recommendations on agency shortfalls.

## **5.11 Support and Expand Recycled Materials Markets**

The Green Industries Program fills an important role in the recycling life cycle by promoting industries that remanufacture or otherwise use recyclable materials. This program should continue to be supported by the State. In addition, Green Industries and other state agencies/programs should work with the Recycling Public Advisory Council to pursue the development of markets for high priority recyclables including paperboard, white paper and junk mail.

## **5.12 Additional Steps Needed to Raise the Diversion Rate Above 25%**

To reach a diversion rate of residential solid waste above 25%, it will be necessary to do all of the above and more. The state will need to mandate a residential solid waste diversion rate for local governments in addition to providing grants to implement waste

reduction and diversion measures. If this step is chosen, the Work Group recommends legislation mandating a diversion rate of 30% by 2004, and 40% by 2007 (including yard trimmings). These rates will be challenging and will require significant additional effort. Mandatory measures such as these have ramifications and impacts (e.g., enforcement, staffing, infrastructure) that would need to be addressed by local governments. The Work Group believes that the establishment of franchise districts for the collection of residential solid waste will be necessary in any areas where curbside collection of recyclables is desired. Please note that one member of the Citizens' Work Group on Recycling does not support any sort of local government mandate. Therefore, it will be crucial to involve local governments prior to implementing a mandatory program.

Franchise districts are not new to Delaware. Sixty-two franchise districts covering 5,702 households, or 14%, have already been established in Kent County at the present time. Homeowners within franchise districts pay \$169.60 per year (approximately \$14 per month) for twice-a-week pick-up. Currently, \$18.80 of the annual fee is an administrative fee for Kent County to run the program. Others living in Kent County, but not covered by a franchise district, pay as much as \$25 per month for once-a-week trash pick-up. For those already in franchise districts, curbside collection of recyclables could replace one trash pick up per week, or per month, in order to keep the extra charge for curbside collection low. Those living outside of franchise districts could not only see a substantial reduction in their monthly bill by forming a district but also could add curbside collection of recyclables under their current rate.

For franchise districts to be successful, they do require a minimum number of contiguous homes (Kent requires 25) for collection efficiencies. Farms and businesses are exempt from Kent County districts. It is important to keep homes contiguous and close due to economic feasibility issues. Farm exclusion sometimes will make it difficult to place all homes under a franchise district, as some areas will not have 25 contiguous homes within a reasonable collection area. However, it will be a useful tool in many areas and should be encouraged.

Mandating a diversion rate and providing grants has worked effectively in several other states. In every state where mandated and specific diversion rates have been implemented, a majority – but not all -- of the communities have selected curbside collection as the method to achieve the goal. With the freedom to choose, some have elected other approaches. Delaware's communities would have the freedom to develop their own strategies for meeting the rate. These strategies could include: implementing curbside collection of recyclables; adopting a pay-as-you-throw system for trash with curbside collection of recyclables or greater participation in 'RECYCLE DELAWARE'; promoting 'RECYCLE DELAWARE' while banning certain recyclables from their trash; implementing a composting program; or developing other creative alternatives to meet the State's rate.

The Work Group recommends that all items considered by the U.S. Environmental Protection Agency to be residential recyclable materials should be included in the diversion rate, including yard trimmings. If yard trimmings are excluded from the definition of recyclables, then the mandated diversion rates will need to be reduced significantly. Each county/municipality should be required to meet the mandatory diversion rate based on the

recycling plan they choose. How it is done will be up to the county/municipality. However, the plans must be reviewed and approved by the Office of Recycling in order to receive grants. Grants to counties/municipalities must be provided for planning, recycling development and implementation, and salaries for recycling coordinators.

The resources required for these additional steps are the same as for the recommendations covered in Sections 5.2, 5.3 and 5.4. The 40% rate cannot be implemented successfully without full funding for both staff and grants.

## **6.0 Closing, Acknowledgements**

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The Work Group would like to thank the following individuals who regularly participated in and contributed to its meetings and to its subcommittee work:

Lonnie Dye, Delaware Coastal Programs  
Gayle Govorko, Division of Air & Waste Management  
Alberta Melloy, Garden Club of Wilmington  
Janet Manchester, Division of Air & Waste Management  
Andrew Stayton, Legislative Consulting, Inc.  
Ellen Valentino, Delaware Soft Drink Association

Thanks also to those who provided information or otherwise assisted in the Group's deliberations:

Rebecca Bedford, Center for Applied Demography & Survey Research  
Paul Bickhart, Recycling Express of Delaware  
Bob Byrd, Wood, Byrd & Associates  
Phil Cherry, Governor Carper's Office  
Glenn Davis, Delaware Solid Waste Authority  
Thom Harvey, Waste Management Inc.  
Alice Jacobsohn, Maryland-Delaware Solid Waste Association  
Rich Lapointe, City of Newark  
Ron Mersky, Widner University  
Ty Neal, Delaware Solid Waste Authority  
Ron Perkins, American Plastics Council  
Maureen Reb, Division of Air & Waste Management  
Jamie Rutherford, Division of Air & Waste Management  
Maurice Sampson, Pennsylvania Resources Council Consulting Team  
Jodie Sleva, Delaware Solid Waste Authority  
John Steele, National Soft Drink Association  
Rich Von Stetten, Delaware Solid Waste Authority  
Guy Watson, New Jersey Bureau of Recycling and Planning  
Arthur Zadrozny, Pennsylvania Resources Council

The Work Group would also like to thank the Delaware Emergency Management Agency, the Delaware Solid Waste Authority, the Department of Natural Resources and Environmental Control, and Wik Associates for hosting some of the Group's meetings.

Finally, the Work Group would like to thank the Honorable Thomas R. Carper, Governor of the State of Delaware, for providing the Work Group members with the opportunity to serve the citizens of Delaware, both present and future.

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## Appendix A: Executive Order No. 60

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NOTE: Retyped

EXECUTIVE ORDER  
NUMBER SIXTY

TO: HEADS OF ALL STATE DEPARTMENTS, AGENCIES, AND AUTHORITIES,  
AND ALL POLITICAL SUBDIVISIONS AND GOVERNMENTAL UNITS OF  
THE STATE OF DELAWARE

RE: CITIZENS' WORK GROUP ON RECYCLING

WHEREAS, Delaware households produce approximately sixty (60) percent of residential solid waste generated in Delaware;

WHEREAS, the Recycle Delaware Program captures and recycles less than five (5) percent of the residential solid waste generated by Delaware households;

WHEREAS, curbside collection of recyclables can be expected to result in both a higher recycling rate and higher costs to homeowners;

WHEREAS, the most successful curbside collection efforts have wide public support;

WHEREAS, while many Delawareans have expressed a desire for curbside collection of recyclables, it is unclear whether Delawareans statewide support curbside recycling; and

WHEREAS, it would be helpful for the General Assembly and the Governor to have a better understanding of the public's view on curbside recycling programs.

NOW, THEREFORE, I, THOMAS R. CARPER, by virtue of the authority vested in me as Governor of the State of Delaware, do hereby declare the Order as follows:

1. There is hereby established a Citizens' Work Group on Recycling.
2. The Work Group shall be composed of representatives from environmental organizations, civic associations, local governments, and other groups that represent the interests of Delaware's citizens.
3. The following organizations shall be invited to appoint a representative: the League of Women Voters, the Civic League of New Castle County, the Delaware Nature Society, the Delaware Chapter of the Sierra Club, the Christina

Conservancy, the Delaware Audubon Society, the Christina Conservancy, the Delaware Environmental Alliance for Senior Involvement (DeEASI). In addition, two representatives from the League of Local Governments, the Kent County Administrator or his designee, the Director of the Delaware Economic Development Office or his designee, a representative from the waste hauling industry, a representative of the Environmental Committee of the State Chamber of Commerce and a representative of the Delaware Solid Waste Authority shall serve on the Work Group.

4. The Chairperson shall be the Director of the Division of Air and Waste Management for the Department of Natural Resources and Environmental Control (DNREC) or his designee. DNREC shall provide staff to support the Work Group.
5. The Work Group shall commission a public opinion survey to determine the level of interest in, and the willingness to pay for, curbside recycling, and shall develop and recommend a course of action to increase recycling in the state, taking into consideration the results of the survey.
6. The cost of the public survey shall be borne by the Delaware Solid Waste Authority.
7. The Work Group shall submit its findings and recommendations to the Governor and the General Assembly no later than February 15, 2000.

Approved this 21<sup>st</sup> day of April, 1999

Thomas R. Carper  
Governor

Attest

Edward J. Freel  
Secretary of State

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## **Appendix B. Work Group Members and Alternates**

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### **Members**

Albert Del Pizzo  
Delaware Audubon Society

Richard Fleming  
Delaware Nature Society

Paul Wilkinson  
DEL EASI

Pat Todd  
League of Women Voters

Marsha Holler  
Sierra Club of Delaware

Thomas E. Houska II P.E.  
Delaware Solid Waste Authority

Marian Young  
Delaware Chamber of Commerce Environmental Committee

Diana Tyrrell  
Kent County Engineers Office

Joan Denney  
Town of Camden

Marjorie A. Crofts  
Dept. of Natural Resources & Envir. Control  
Air & Waste Management

Brian Lockhart  
Harvey & Harvey, Inc.

Ron Breeding  
City of Seaford

Rob Propes  
Delaware Economic Development Office

### **Alternates**

Andy Urquhart

Bill Walsh  
Delaware Nature Society

Ken Mulholland

Bruce Patrick  
Kent Cty Engineers Office

Nancy Marker  
Dept. Of Natural Resources  
Air & Waste Management

Bill Lower  
Harvey & Harvey, Inc.

Rob Skomorucha  
DEDO



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## Appendix C. List of Meeting Presentations, Group Meetings and Subcommittee Meetings

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June 16, 1999	Full Work Group
July 15, 1999	Full Work Group Recycling in Delaware by Rich Von Stetten, DSWA Camden Survey by Joan Denney, Town of Camden
July 19, 1999	Request for Qualifications Development Subcommittee
August 4, 1999	Full Work Group RFQ presentations by the Melior Group, Pennsylvania Resources Council and Potomac Incorporated
August 25, 1999	Full Work Group Draft Survey by the Pennsylvania Resources Council
September 15, 1999	Full Work Group Potential Cost Saving Strategies for Curbside Collection Programs by Ron Perkins, American Plastics Council Pay-As-You-Throw Video by EPA Delaware Recycling Center/Cherry Island Landfill Tour by DSWA
September 23, 1999	Cost Subcommittee
September 24, 1999	Outreach Subcommittee
October 12, 1999	Cost Subcommittee
October 20, 1999	Full Work Group City of Newark's Pilot Curbside Recycling Program by Rich Lapointe Survey Results by the Pennsylvania Resources Council
October 25, 1999	Cost Subcommittee
November 3, 1999	Full Work Group Recycling Express of Delaware by Paul Bickhart
November 10, 1999	Cost Subcommittee
November 17, 1999	Full Work Group and Outreach Subcommittee
November 22, 1999	Beverage Container Law Subcommittee
November 24, 1999	Cost Subcommittee
November 30, 1999	Outreach Subcommittee

A Course of Action to Increase Recycling  
In the State of Delaware  
March 1, 2000

December 1, 1999	Full Work Group Phoenix Video
December 8, 1999	Diversion Subcommittee
December 9, 1999	Cost Subcommittee
December 15, 1999	Full Work Group
January 5, 2000	Full Work Group Beer Bottle Consumption/Returns in Delaware by Bob Byrd
January 7, 2000	Cost Subcommittee
February 2, 2000	Full Work Group
February 23, 2000	Full Work Group

The 12 Work Group members and 3 regular attendees each spent approximately 75 hours at meetings for a total of 1125 hours. These hours do not account for travel time, the time other interested parties spent attending meetings or in the time spent researching, writing and reviewing the Group's various reports.

## **Appendix D. Survey**

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“Recycling in Delaware: Public Attitudes and Perceptions” prepared for the Citizens’ Work Group on Recycling by the Pennsylvania Resources Council, October 1999, was printed under separate cover and is available from the Department of Natural Resources and Environmental Control, Division of Air & Waste Management, (302) 739-4764.



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## **Appendix E. Draft Legislation, EPA's Procurement Guidelines**

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### **AN ACT TO AMEND CHAPTER 64 OF TITLE 7 OF THE DELAWARE CODE REGARDING THE PLACEMENT OF 'RECYCLE DELAWARE' CENTERS.**

WHEREAS, large retail stores are the primary source from which consumers acquire materials that should be recycled following consumer use or consumption; and

WHEREAS, large retail stores and landlords of such stores benefit significantly from the commercial retail business which leads to the generation of recyclables; and

WHEREAS, residents of large residential developments and multi-family complexes are a significant source from which materials that should be recycled are used or consumed; and

WHEREAS, the State is the State's largest employer and its offices generate a significant source from which materials that should be recycled are used or consumed; and

WHEREAS, the State's children will reap the benefits from diverting recyclable materials from landfills, conserving natural resources and creating markets for recyclable materials; and

WHEREAS, maximization of recycling at 'RECYCLE DELAWARE' centers is a signification goal of the State for the benefit of the environment, minimization of landfill consumption, and the protection of the public health and welfare; and

WHEREAS, large retail stores, housing developments, apartment/townhouse/condominium complexes, State-owned lands and public schools are convenient locations for public use of 'RECYCLE DELAWARE' centers and, in the more densely populated areas of the State, it has been difficult to find appropriate sites for 'RECYCLE DELAWARE' centers.

THEREFORE, BE IT ENACTED by the General Assembly of the State of Delaware (two-thirds of the Members of each House thereof concurring):

Section 1. Amend Section 6454 of Title 7 of the Delaware Code by inserting the following after the first sentence thereof:

- (1) The owner, landlord, operator or tenant of any retail store having a gross retail area in excess of 50,000 square feet and constructed or adding parking space area after

July 1, 2000 shall make available on a continuous basis a suitable area, not less than 80 feet by 100 feet, in the parking area for such store or other appropriate adjacent area, upon request and as designated by the Authority, without cost, for the establishment and operation of a 'RECYCLE DELAWARE' center;

(2) The developer of any housing development or manufactured housing development having a housing unit number in excess of seventy-five (75) and constructed after July 1, 2000 shall make available on a continuous basis a suitable area, not less than 80 feet by 100 feet, in the paved area of the development, upon request and as designated by the Authority, without cost, for the establishment and operation of a 'RECYCLE DELAWARE' center;

(3) The developer, landlord, or operator of any apartment, townhouse or condominium complex having a housing unit number in excess of twenty-five (25) and constructed after July 1, 2000 shall make available on a continuous basis a suitable area, not less than 80 feet by 100 feet, in the paved area of the development, upon request and as designated by the Authority, without cost, for the establishment and operation of a 'RECYCLE DELAWARE' center;

(4) The State agency owning or managing any state facility, excluding parks and natural/wildlife areas, that have not exceeded a 75 percent parking capacity in its parking area or any state facility constructed or adding parking space area after July 1, 2000 shall make available on a continuous basis a suitable area, not less than 80 feet by 100 feet, in the paved area of the facility upon request and as designated by the Authority, without cost, for the establishment and operation of a 'RECYCLE DELAWARE' center; and

(5) All public school districts with schools that have not exceeded a 75 percent parking capacity in its parking area or any public school constructed or adding parking space area after July 1, 2000 shall make available on a continuous basis a suitable area, not less than 80 feet by 100 feet, in the paved area of the school, upon request and as designated by the Authority, without cost, for the establishment and operation of a 'RECYCLE DELAWARE' center.

AN ACT TO AMEND TITLE 29, CHAPTER 68, OF THE DELAWARE CODE BY  
REQUIRING STATE AGENCIES TO PURCHASE RECYCLED, REUSABLE, AND  
RECYCLABLE PRODUCTS WHENEVER FEASIBLE AND PRACTICAL.

WHEREAS, the State of Delaware disposes of approximately 800,000 tons of municipal solid waste each year; and

WHEREAS, the State of Delaware's participation in and promotion of recycling programs will significantly reduce the amount of solid waste disposed of by removing recyclable materials from the waste stream and making them available for reuse by industry; and

WHEREAS, for recycling programs to market the growing quantities of recyclable materials, industrial demand to use recycled materials in manufacturing processes must increase and consumer demand to purchase industries finished products made from recycled materials must increase; and

WHEREAS, the State, as a consumer, purchases approximately \$170,000,000 worth of goods each year, and the State desires to purchase finished products made from recycled materials, designed for recyclability, or emphasizing waste reduction, wherever feasible; and

WHEREAS, Executive Order #82 requires that the Department of Administrative Services review and revise all product procurement specifications in order to establish a preference for those containing recycled materials wherever feasible; and

WHEREAS, Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. §6962) requires that states using federal funds for procurement buy recycled products in certain circumstances and the U.S. Environmental Protection Agency (EPA) has prepared Comprehensive Procurement Guidelines on 36 specific materials for use by states in meeting the requirements of the law;

THEREFORE, BE IT ENACTED by the General Assembly of the State of Delaware (two-thirds of the members of each house thereof concurring):

Amend Title 29, Del. Code, Chapter 69, by adding thereto the new section, §6923-§6924, to read:

**§ 6923. Purchase of recycled, reusable, and recyclable products**

- (a) The State shall have as a goal the maximum feasible purchase of recycled content products and reusable or recyclable products, and the maximum feasible percentage of post-consumer recycled content in its purchases. For any item that is being purchased by the State and for which the U.S. Environmental Protection Agency has developed a Comprehensive Procurement Guideline, it shall be a goal of the State to purchase that item with a recycled content that meets or exceeds the EPA guideline standards.

- (b) Prior to initiating a request to the Department of Administrative Services (Department) for any product, an agency for which the Department makes purchases shall review its existing specifications for such product to determine whether conformance with the Comprehensive Procurement Guideline is directly or indirectly excluded. The agency must eliminate any such exclusion from its specifications, unless it can demonstrate in writing to the Department's satisfaction that the exclusion is either:
  - (1) operationally necessary;
  - (2) legally mandated; or
  - (3) necessary to avoid excessive cost.
- (c) When requesting any purchase of a product for which the U.S. EPA has established a Comprehensive Procurement Guideline, an agency for whom purchases are made by the Department shall ensure that the product meets or exceeds the recycled content specified in the guideline standards, unless the agency can demonstrate in writing to the Department's satisfaction that a product meeting the standards either:
  - (1) is not available competitively;
  - (2) is not available within a reasonable time frame;
  - (3) does not meet appropriate performance standards; or
  - (4) is available only at an unreasonable price.
- (d) State professional service contracts shall include a requirement that the provider shall, in the purchase of any printing services, adopt a policy substantially similar to that set forth in subsection (a) of this part.

#### **§ 6924. Reporting**

The Department, in association with the Delaware Economic Development Office, shall develop a methodology for the tracking of purchases of agencies in accordance with §6923.

**EPA's Recommended Content Levels for Non-Paper Office Products**

<b>Non-Paper Office Product<sup>1</sup></b>	<b>Recovered Material Content Recommendations</b>
Recycling Containers and Waste Receptacles: --Plastic --Steel --Paper --Corrugated --Solid Fiber Boxes --Industrial Paperboard	20 -100% (postconsumer) 25 -100% 25 -50% (postconsumer)/ 25 -50% (total) 40% (postconsumer) 40 -80% (postconsumer)/ 100% (total)
Plastic Desktop Accessories (polystyrene) including desk organizers, sorters, and trays, and memo, note, and pencil holders	25 -80% (postconsumer)
Binders: --Plastic-covered --Paper-covered --Pressboard	25 -50% 75 -100% (postconsumer)/ 90 -100% (total) 20% (postconsumer)/ 50% (total)
Trash Bags (plastic)	10 -100% (postconsumer)
Toner Cartridges	Return used toner cartridges for remanufacturing and reuse or purchase a remanufactured or recycled-content replacement cartridge.
Printer Ribbons	Procure printer ribbon reinking or reloading services or procure reinked or reloaded printer ribbons.
Plastic Envelopes	25% (postconsumer)/ 25 - 35% (total)

<sup>1</sup>EPA's recommendations do not preclude procuring agencies from purchasing non-paper office products manufactured using other materials, such as wood or cloth. EPA simply recommends that procuring agencies, when purchasing non-paper office products designated in the procurement guidelines, purchase these products containing recovered materials.



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## **Appendix F. Cost Subcommittee Report**

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**Final Report by the Cost Subcommittee**  
of the Citizens' Recycling Work Group  
February 25, 2000

**Subcommittee Members: Diana Tyrrell (Chair), Janet Manchester, Rob Propes, Paul Wilkinson**

### **I. INTRODUCTION**

The purpose of the cost subcommittee report is to provide the Citizens' Work Group on Recycling with a range of costs associated with implementing different types of programs in urban, suburban and rural areas to facilitate residential recycling. The subcommittee report will also discuss strategies used by other communities across the country to minimize recycling program costs and produce a net savings in their waste management budgets. In addition, the report will provide estimates of costs associated with implementing the Work Group's recommendations.

### **II. EXECUTIVE SUMMARY**

Due to the multitude of parameters that drive the costs of a residential recycling program, it is difficult to correlate the costs of various programs currently operating across the country to Delaware with a high degree of accuracy. Program design, frequency of pickup, types of materials collected, systems used to process recyclables, proximity of end-markets, and labor costs are just a few of the variables that impact the cost of establishing a recycling program. For this report, information was gathered from a variety of sources to identify the costs associated with recycling programs. The information presented is based on the experience of recycling programs operating in Delaware and in other states.

Delaware's largest recycling program is 'RECYCLE DELAWARE' which includes igloo and drop-off programs operated by the Delaware Solid Waste Authority (DSWA). The 'RECYCLE DELAWARE' igloo program diverts approximately 5% of the residential solid waste generated in Delaware. In an attempt to provide a broad understanding of the impact of expanding Delaware's efforts to recycle more residential solid waste, the cost subcommittee identified the operating costs of 'RECYCLE DELAWARE', isolated curbside programs in the State, and costs of residential recycling programs in communities of other states. The 'RECYCLE DELAWARE' program costs \$137 per ton of materials collected or \$0.72 per month per household. (Households do not actually pay this amount. It is spread out over the whole system and is subsidized by DSWA tipping fees.) Based on other

communities, a cost for curbside collection in Delaware of \$2 to \$3 per month per household may be reasonable to expect in some areas.

When reviewing the costs of the various curbside recycling programs operating in Delaware by municipalities or private haulers, it should be noted that the cost of recycling these materials is currently subsidized by DSWA. Currently, DSWA does not charge for recyclables delivered to its intermediate processing facility by haulers or municipalities. However, if recycling programs were instituted that significantly increased the volume of materials processed by DSWA, the Authority would need to consider levying a tipping fee on those materials to help cover the processing costs. Additionally, with an increase in the amount and types of recyclables delivered, the Authority may have to enhance its processing capabilities through capital and human resource investments.

Based on recycling programs in communities across the country, the subcommittee summarized several strategies used by top performing communities to reduce costs and increase the revenue generated by recyclables. Two strategies which have the potential to provide the greatest impact on reducing the cost of providing recycling and trash collection services are volume-based trash collection fees (Pay-As-You-Throw), which has been adopted by dozens of communities across the country, and cooperative (group) contracting by municipalities or community groups on behalf of their residents.

In the final section of the report, costs are profiled for the Work Group's recommendation to establish an office of recycling within the Department of Natural Resources and Environmental Control (DNREC). As proposed, this new office would consist of a five-person staff to conduct education and outreach programs and administer a grant/loan program.

Much of the cost data presented in this report is centered on residential curbside collection of recyclables. The reader should keep in mind that 25% of Delawareans do not have curbside trash removal services. Thus, a curbside recycling program may not be a feasible solution for these individuals.

### **III. METHODOLOGY**

The methodology used to develop this report included: a literature review of the most current documents published by the Environmental Protection Agency on community-based recycling, studies commissioned by DSWA, and research papers by independent experts and non-profit organizations. In addition, the group conducted one in-person interview and numerous phone interviews. The information was summarized by each group member and presented to the subcommittee for review and discussion. The information was then gleaned to support the recommendations offered by the Citizens' Recycling Work Group. The cost subcommittee held a total of eight meetings, each lasting approximately two hours. Outside the meetings, each subcommittee member spent several hours gathering information and preparing this report.

#### **IV. 'RECYCLE DELAWARE' (IGLOO) PROGRAM**

The primary system for collecting recyclables from Delaware households is the voluntary 'RECYCLE DELAWARE' Program run by the Delaware Solid Waste Authority (DSWA). There are 131 locations throughout the state where residents can deposit material in "Igloo" containers. The recyclable material is transferred to the intermediate processing facility (IPF) in New Castle County where it is prepared for sale.

The Municipal Solid Waste (MSW) stream for Delaware in 1997 was estimated based on generation as 626,000 tons in the 1999 Franklin Associates' report. The report data is summarized in Table 1. MSW is composed of Residential Solid Waste and Commercial Solid Waste. In Delaware, Residential Solid Waste (RSW) is about 60% of the total MSW stream or 372,195 tons. RSW includes 'Product Waste' (durables, nondurables, and containers/product packaging, etc.) and 'Other Wastes'. 'Other Wastes' include Miscellaneous Waste, Food Waste and Yard Waste (grass, leaves, wood trimmings, etc.) Estimated generation of RSW includes 238,847 tons of Product Waste and 133,348 tons of Other Waste.

'RECYCLE DELAWARE' targets 73,800 tons of the RSW product waste in the "Igloo" program and little or no yard waste. The standard recycle mix collected at the igloos includes: newspaper, magazines, telephone books; glass bottles; cans; and plastic containers. Some igloo sites also have collect textiles, used oil filters, used motor oil and/or cardboard. Household batteries from the Igloo sites are collected for proper disposal and not recycled.

The amount of RSW that is diverted from landfills by the 'RECYCLE DELAWARE' Igloo program is about 5%. In addition to the Igloos, DSWA collects other materials for recycling in a separation program at the three landfills. For instance, white goods (refrigerators, washers, etc.) and tires are separated from the waste stream and are not placed in the landfill. The total material from the two programs is about 14% of the Residential Solid Waste (RSW) stream.

Programs in other states target additional materials in their recycle mix and therefore potential tonnage available for reclamation is higher. They include paperboard, junk mail, office paper, other paper, paper bags and yard trimmings in their recycle mix as well as the standard materials mix used by 'RECYCLE DELAWARE'. However, increasing the standard recycle mix of 'RECYCLE DELAWARE' may increase operation costs which are not offset by revenues.

In 1998, the 'RECYCLE DELAWARE' program cost \$137 per ton of recyclables or \$0.72 per month per household based on 275,000 households in Delaware. The actual cost is spread out over the whole system and is subsidized by DSWA tipping fees as previously mentioned. This cost included transportation, processing and marketing of all material collected by 'RECYCLE DELAWARE' and additional materials brought to the DSWA Intermediate Processing Facility (IPF). 'RECYCLE DELAWARE' is operating statewide whereas programs in other states serve limited areas. Although no analysis of 'RECYCLE

DELAWARE' costs by county has been made, the cost in Sussex County is expected to be higher due to the greater distance to the processing facility.

**Table 1. Analysis of Delaware Municipal Solid Waste in 1997**

	<u>Tons</u>	<u>% of RSW</u>
<b>Municipal Solid Waste (MSW)</b>	626,100	-----
<b>Residential Solid Waste (RSW)</b>	372,195	100
<b>RSW Products</b>	238,847	64
<b>RSW Yard Waste</b>	91,500	15
<b>RSW Food Waste</b>	37,448	10
<b>RSW Misc. Waste</b>	4,400	1
<b>Targeted Recycles Mix for 'RECYCLE DELAWARE' (RD) Igloos</b>	73,800	20
<b>Actual RD Igloo Collection (23% of the targeted mix)</b>	17,100	5
<b>Total DSWA Recycle Delaware (Igloo and drop-off at landfill)</b>	50,800	14

Sources: Franklin Associates (1999), DSWA (1999)

It is important to understand the existing collection practices for different materials throughout the State as new collection programs may be competing for the same materials as 'RECYCLE DELAWARE'. Table 2 contains targeted tons based on population, collected tons based on actual data from DSWA records, and an estimated diversion rate from the RSW Stream. Statewide, 'RECYCLE DELAWARE' is collecting 38% of targeted newspaper. This percentage compares favorably with newspaper collection in other states' programs. In Sussex County, the estimate for newspaper collection is 53%. Therefore, adding new local program for newspaper in Sussex might increase overall collection, but the operation costs of both the 'Recycle Delaware' program and the local program may be affected and decrease overall efficiency. In general, this conflict also applies to the other two counties and possibly to other materials that may be considered.

'RECYCLE DELAWARE' participation in Sussex County seems to be greater than in the other two counties as shown in Table 2 based on total recyclables and paper. This may be due to the location of the Igloos in the county. However, it may also be due to the fact that many Sussex households do not have garbage removal services and take their garbage directly to a local transfer station or the landfill which have 'RECYCLE DELAWARE' igloos.

**Table 2. 'RECYCLE DELAWARE' - 1998**

		Recycles		Paper	
		Tons	Diversion Rate	Tons	Diversion Rate
<b>Statewide</b>	<b>Targeted</b>	74,000		32,300	
	<b>Collected</b>	17,147	23%	12,400	38%
<b>New Castle Co.</b>	<b>Targeted</b>	48,000		21,000	
	<b>Collected</b>	10,000	21%	7,300	36%
<b>Kent Co.</b>	<b>Targeted</b>	12,000		5,200	
	<b>Collected</b>	2,400	21%	1,700	32%
<b>Sussex Co.</b>	<b>Targeted</b>	14,000		6,000	
	<b>Collected</b>	4,700	33%	3,200	53%

Source: Wilkinson (Target data based on population. Collection data was supplied by DSWA.)

If the 'RECYCLE DELAWARE' program were expanded to include more materials, or if a curbside recyclable collection program were instituted, it would be necessary either to expand the processing capabilities of the current intermediate processing facility located in New Castle County or to construct a new public or private processing facility. The extent and cost of the upgrades to the facility would depend largely on the estimated quantity of and types of materials and the method of collection (i.e., pre-sorted or commingled). A large targeted mix of commingled recyclables would require the most extensive upgrades, whereas a smaller mix of source-separated materials would require less extensive upgrades. Based on information from Arizona, costs could range from \$6 to \$12 million to build a state-of-the-art facility capable of separating commingled recyclables. Depending upon the design of the curbside programs, costs may be incurred by haulers at the point of collection if new compartmentalized trucks are needed to sort materials, or by DSWA at the processing facility where new processing equipment may be needed to sort recyclables. Subsequently, these costs may be borne by the customer.

## V. OTHER RECYCLING PROGRAMS OPERATING IN DELAWARE

There are several public and private curbside recycling programs operating in Delaware. Elsmere, the Arden Area, Wilmington and Camden have existing programs. A test program for recycling collection was completed in Newark, but the program was discontinued. In addition, a private collection enterprise has been initiated by Recycling Express, Inc. It should be noted that these programs are currently subsidized by DSWA.

Currently, DSWA does not charge for any recyclables delivered to its intermediate processing facility. The programs are discussed below.

- The Town of Elsmere has a curbside collection program where recyclables and bulk items are picked up mid-week and trash is picked up twice a week. Materials collected for recycling are newspaper, magazines, and other household paper. They are taken to DSWA's processing facility. Elsmere collect approximately 50 tons of trash and 1 to 2 tons of recyclable paper every week. The recycling participation rate is about 20 to 25 percent of the residents. They had also collected cans and glass containers at one time, but stopped because of lack of participation. The town vacuums leaves from the street for composting. Only leaves that have fallen into the street are collected; residents are not supposed to rake leaves from their yards into the street.
- Nearly five years ago, the Arden Area (Villages of Arden, Ardencroft, Ardentown) began curbside collection of mixed paper, cardboard, clear glass, steel cans, and aluminum using a 2-container system with twice a month pickup. Arden contracts with a private hauler and no data is available on the amount of recyclables actually collected.
- The City of Wilmington has a pilot curbside collection program for newspaper, magazines and paper for 1,500 households in the Brandywine Hills, Union Park Gardens and Wawaset Street area. The program serves about 5 percent of the City's households and collects approximately 24 to 36 tons of paper per year.
- The Town of Camden began a curbside collection program for newspaper on October 1, of 1999 after two years of research and one year of working with DSWA. There are 200 out of 717 households (27.9%) participating in a program where newspaper is collected twice a month. Both T.V. and radio news media were used to promote the program. Based on an initial survey, only 18 participants said they currently recycled. Many residents are now asking to recycle other items. The town hopes to add to the program this spring. In addition to newspaper, Camden recycles Christmas trees annually by picking them up during the month of January. The newspaper collection program is continued with the assistance of DSWA. The residents also receive one bulk pickup on the last Tuesday of the month when they notify Town officials of items. Local resale dealers as well as local appliance repair service shops are notified when items are available. A large number of the bulk items are removed prior to the Town's pickup.
- The City of Newark ran a curbside recycling test for newspapers with 500 households for six months during 1996. Only 765 tons of newspaper were collected versus an expected 1,010 tons. The costs of the test were \$183 per ton for recyclables versus \$129 per ton for trash. A comparison of the weight of newspaper collected by the curbside test to that deposited in the 'RECYCLE DELAWARE' Igloos in Newark for the same period of time led the program managers to conclude that most of the curbside collected newspaper would have been deposited in the Igloos. This conclusion is consistent with the high level of newspapers being collected through the statewide Igloo sites. Due to the lower than expected collection rate and high cost, the program was discontinued.

- Recycling Express of Delaware, Inc., a private recycling service, currently collects recyclables from 175 residential customers and 100 commercial customers in New Castle County on a biweekly basis. The typical cost for the recyclable collection service is currently \$144 per year in addition to charges the residential customer must pay for regular trash removal. If an entire neighborhood were to contract for recyclable collection services, the cost might be up to 25 percent lower. There is a sector of the population who is willing to pay for the service.

## **VI. RECYCLING PROGRAMS IN OTHER COMMUNITIES**

Curbside collection programs and recycling experiences vary from state to state and city to city and so do the costs associated with the programs. The cost of curbside recycling is \$2.56 per month per household on average in 13 of the high diversion areas listed in EPA's "Cutting the Waste Stream in Half." The program costs in these cities vary from \$1.24 to \$5.04 per month per household and are contract-driven rather than market-driven. These values are summarized in Table 3 on a "per household" basis. Collection of recyclables, yard waste, and trash in high diversion towns averages about \$145 per household per year. These costs were the same or slightly higher prior to starting the composting and recycling programs. Although similar in range to the cost paid by households in Delaware municipalities listed in Table 6, the smallest high diversion town from Table 3 has 2,790 households and the largest has 248,970 households. Thus, it may be valid to compare these costs to those expected in similar size Delaware municipalities. For comparison to the 'RECYCLE DELAWARE' program, a drop-off program is also included in Table 3. As expected, drop-off programs are typically less costly than other types of programs.

**Table 3. 1996 Residential Solid Waste Costs in High Diversion Towns**

City, State	Curbside Collection Frequency	# of Households	Recycle Cost	Compost Cost	Trash Cost	Total Cost
			\$ per month per household			
Chatham, NJ	2 Weeks	2,790	1.46	4.35	13.17	18.98
Falls Creek, VA	Weekly	2,928	3.17	6.07	8.69	17.93
Crockett, TX	Weekly	3,293	1.94	1.74	2.05	5.73
Fitchburg, WI	Weekly	3,860	3.15	1.48	4.38	9.01
Dover, NH	Weekly	11,000	2.06	0.33	3.65	6.04
Loveland, CO	Weekly	16,422	2.00	1.77	3.36	7.13
Bellavere, WA	Weekly	23,372	5.04	4.87	9.72	19.63
Clifton, NJ	3 Weeks	29,300	0.99	1.52	12.30	14.81
Ann Arbor, MI	Weekly	46,000	1.96	1.00	3.51	6.47
Worcester, MA	Weekly	50,868	1.24	1.02	4.01	6.27
Madison, WI	Weekly	57,949	3.12	2.83	8.58	14.53

Sources: US EPA, "Cutting the Waste Stream in Half," 1999; and DSWA.

The City of Salisbury, MD currently contracts its residents' recyclable collection at \$2.85 per month per household. It is not known whether Salisbury charges an additional administration fee. In 1996, Newark, DE received a quote of \$2.16 per month to pick up their residents' recycle material. Both cities have about 8,000 households which is well above the minimum 1,000 households and optimum 5,000 households that two waste hauling companies consider optimum for a curbside collection program.

Based on this information, a cost for curbside collection in Delaware of \$2 to \$3 per month per household may be reasonable to expect in some communities. Based on the results of the survey commissioned by the Work Group, an additional cost of \$2 to \$3 per month per household would be unacceptable to the majority of Delaware residents unless a compensating reduction in trash cost can be achieved.

Several recycling programs are listed by type with costs per ton in Table 4. A combination of drop-off stations, curbside programs, composting and volume-based trash fees are being used to achieve New Hampshire's 40% diversion goal. There are 200 drop-off stations throughout the state called transfer stations. These supplement curbside

recycling run by NH municipalities. The program run by Dover, NH is an example of a well-run high diversion program with 35% of product waste and 17% of yard waste from the RSW stream being diverted from the landfill. This program is run at a recycle cost of \$74.69/ton versus a trash cost of \$114.58/ton. The total of these costs is less per household than the original trash cost before the program. However, one should not expect cost to go down with recycling.

Phoenix, AZ selected 20 materials to target with their curbside program. Because they have a “state of the art” Materials Recovery Facility (MRF), they are able to provide commingled collection which limits the amount of separation required by the household. A state of the art MRF, such as the one in Phoenix, AZ which handles more than 100,000 tons of recyclables, will cost \$12 to \$16 million. This type of public or private facility does not currently exist in Delaware and it should be further examined. A payback analysis should be performed to examine annual operating costs and to see when the initial capital costs could be recovered. A cost-benefit analysis should be done as well. A greater number of materials could be processed, or more material recovered such that a MRF might be cost effective. During the analyses, several questions will need to be answered including: 1) Who will own, operate, and pay for the facility? and 2) How will no guarantee of flow affect the facility and its efficiency? Such analyses are beyond the scope of this subcommittee.

Based on the Concord, NH test program, curbside programs should be undertaken only in areas of concentrated households when cost is a primary concern. Based on the Work Group’s survey, cost is a concern in Delaware. Information from EPA and other sources show that the most effective programs in terms of participation have mandatory curbside recycling on a local basis or volume-based trash collection fees.

**Table 4. Other Communities' Recycling Programs vs. Delaware**

	# of Households	Type of Program	Participation Rate Percent, %	Diversion Rate, % Product / Yard Waste	Recycle Cost \$/ton	Trash Cost \$/ton
Leverett, MA	650	Rural DO	NA	30 / 23	34.30	91.00
Chatham, NJ	3,285	Sub. All	80	22 / 43	38.72	157.00
Crochett, TX	3,293	Rural C	80	20 / 32	181.90	62.41
Dover, NH	11,315	City C, DO	74	35 / 17	74.69	114.58
Ann Arbor, MI	46,000	Urban All	93	29 / 23	95.42	85.58
Worcester, MA	63,588	Urban C	NA	27 / 27	54.06	96.00
Phoenix, AZ	317,000	Urban C	80	19 / --	NA	NA
State of DE	275,000	Varies DO	49	12 / 2	137.00	203.00 <sup>1</sup>
Abbreviations :	C=curbside	DO=drop off	PU=Pickup	All = C, DO, & PU	Sub. = Suburban	

Sources: EPA, DSWA

Note: <sup>1</sup> Approximate trash cost in Delaware was derived using the statewide average trash cost of \$22/month/household from the survey, the total RSW for 1997, and assuming 275,000 households. The number of households is from the 1990 census.

## VII. STRATEGIES TO REDUCE THE COSTS OF RECYCLING

Variations in trash and recycle management in Delaware may negate a single solution. For example, 25% of the respondents to the survey have no curbside or alley trash pickup. There are many small towns and few urban areas throughout the State. All states with existing recycling programs have different areas that required different solutions for recycling efforts. Strategies that may be used include curbside recycling, yard waste collection, volume-based trash collection, and group service or cooperative contracting. Many of these may be combined to customize the community's recycling program.

Curbside Recycling: A curbside recycling program must be customized to fit the community that it serves. There is no single strategy applicable to every situation to produce a cost effective program with a high diversion rate. However, experience has taught recycling officials and community leaders a number of strategies that can often be implemented to reduce the costs of curbside recycling programs which include:

1. Provide residents with large containers for their recyclables, and educate them to put the containers out at the curb only when they are full. This will provide more efficient collection.
2. Consider picking up recyclables every other week (rather than weekly). Again, this will increase collection efficiency.
3. Substitute a recycling pickup for a garbage pickup. This costs less than adding a pickup day. With convenient recycling available, residents should generate less trash and should be able to get by with less frequent trash pickup, particularly if they have twice-a-week pickup. This allows efficient use of trucks and personnel with little or no added cost. This concept could be used in some areas of Delaware. However, there is only one processing facility located in the state so transportation costs will also be a factor for local programs. This method of operation has helped Salisbury, MD adopt recycling with little additional cost.
4. Utilize compartmentalized trucks that can accommodate trash and recyclables at the same time. Picking up trash and recyclables in the same trip eliminates the need for multiple truck trips through the same community.
5. Use large trucks designed to lift containers mechanically and maximize the use of space. The maximum height (and consequently the volume) of non-mechanized vehicles is limited by the sanitation workers' ability to lift the trash or recyclables containers into the holding compartment. With mechanized lifting, the height of the truck is no longer limited in this way. A larger capacity truck means fewer trips with resulting cost savings.
6. Initially, collect only materials that have a high market value to help offset collection and processing costs (typically aluminum); and as feasible expand the program to include additional materials based on market conditions. In general, it is better to start with a few materials and expand the program as it is not a good idea to drop materials.
7. Find a place to stockpile recyclables. The ability to store materials enables the program take advantage of the most favorable markets.
8. Develop cooperative marketing agreements with neighboring communities. Combining forces with other recycling programs can broaden potential markets.
9. Implement Pay-As-You-Throw pricing for trash disposal. This system gives residents an incentive to reduce and recycle their waste. This translates into savings on disposal (if the municipality provides this service) and a higher recycling rate.
10. Provide drop-off centers in areas where curbside recycling is not practical or to augment curbside programs. Drop-off centers are less costly than curbside recycling. In rural areas or areas without curbside trash pickup, drop-off recycling may be the

- only reasonable strategy. Drop-off centers can also provide places for people to recycle materials that are not included in a curbside program.
11. Implement source reduction and reuse strategies. This will reduce the quantity of waste being disposed of, saving on tipping costs.
  12. Develop local markets for targeted recyclables. This will not only save on transportation costs but will also facilitate the customization of the recycling program to ensure that the material being collected is what the end user needs.
  13. Provide ongoing education and promotion programs. Continuous outreach is necessary to keep residents motivated and to educate new residents about the program.
  14. Determine the number of materials to be collected and their separation method. Currently, materials accepted must be source-separated to be taken to the existing Intermediate Processing Facility. Commingled collection would allow a 2-bin system. However, the commingled material would need to be separated at a new Materials Recovery Facility (MRF).

Yard Waste: Most high diversion municipalities and states have active collection and composting programs for yard waste. Four Delaware municipalities (Newark, Dover, New Castle and Rehoboth Beach) collect leaves separately for mulching or composting. There is little actual measurement of the amount of yard wastes separated from Residential Solid Waste in Delaware. In addition, many lawn services and homeowners also compost yard waste, but there are no estimates of how much yard waste is being diverted. The advantages of a yard waste program appear to be lower overall collection and processing costs and an increase in the overall diversion rate.

Volume-based trash collection fees: A different approach to trash collection and payment is volume-based trash collection where a household pays a unit price based on its waste generation, i.e., by the number of bags or containers. Unit pricing is prevalent in the commercial sector and has been used for years. In the residential sector, this is also known as Pay-As-You-Throw (PAYT). Although this is not recycling, it is a way to encourage households to directly manage their waste. Those who recycle, compost or reduce the materials they buy can reduce their waste disposal costs. PAYT may be a reasonable alternative to mandated curbside recycling or landfill bans. It is being used in many areas across the U.S. PAYT could also be used in conjunction with curbside recycling or the 'RECYCLE DELAWARE' program.

One of the advantages of PAYT is its versatility. Its effectiveness is not dependent on mandatory recycling or on curbside recycling so long as a means to recycle is available. It also is not dependent on any specific method of trash hauling. Collection by private hauler, pickup by a government entity, or self-hauling by the homeowner are all viable.

There are many ways of implementing PAYT. Some communities provide various sizes of trash cans whereas the homeowner pays one rate for the smallest can, a higher rate

for a larger can, etc. Other programs involve the use of bags which must be purchased by the residents. Still other communities require resident to purchase stickers which must be affixed to the bags of trash that are set out at the curb. In Delaware, people who haul their own trash to a landfill or transfer station are utilizing a PAYT system that consists of purchasing tickets that get punched each time a bag of trash is disposed. The landfills and transfer stations are equipped with 'RECYCLE DELAWARE' centers where recyclable can be deposited at no charge. Therefore, anyone using these facilities has the option of reducing disposal fees by placing all recyclables in the igloos rather than paying to dispose of them.

Many municipalities that provide trash services to their residents have found that implementing PAYT has resulted in significant savings by decreasing the amount of waste being disposed. Reductions of 25% to 45% have been reported. The costs involved in implementing a PAYT system are minimal as there will need to be little or no change in the way the trash is picked up.

Cooperative (Group) Contracting: Based on the Work Group's survey, households in Delaware pay an average of about \$22 per month per household for trash collection. The majority of households in unincorporated areas of the counties must contract for trash service on an individual basis or must take their trash to the transfer station or landfill. When an individual contracts with a hauler, costs are typically more than fees charged by direct government services or through group contracting units. Table 5, which is not exhaustive, examines the range of costs paid by individuals for trash collection which are as high as \$27 per month per household. In some municipalities, the local government does not provide direct trash service or provide group contracting as is the case in the City of Seaford, the Town of Woodside, and the Town of Hartly. If trash service is desired, residents of these municipalities typically contract for it on an individual basis.

Group collection service for Delaware communities is typically provided through a municipality using direct municipal workforce or a contracted workforce. Group collection service for multiple households appears to offer an advantage over individually contracted services with private haulers. (See Table 6 for costs by group.) The Town of Hartly with 43 households is investigating group contracting to lower costs to each household according to its Mayor.

**Table 5. Individual Trash Contracts**

<b>Individual Basis</b>	<b># Trash Pickups/Wk</b>	<b>Cost \$/Mo/Household</b>
New Castle County, Suburban	1-2	18.00 - 27.00
Kent County, Rural	1	21.00 - 25.00
Kent County, Town of Hartly	1	24.87
Sussex County, Rural	1	19.00 - 23.00
Sussex County, City of Seaford	1	18.00 - 23.00

Based on information in Table 6, the Town of Georgetown offers trash service to its residents at one of the lowest municipal rates in the state. Its charge is an average of \$6.67 per month. Conversely, the City of Milford has one of the highest rates at \$16.50 per month. Comparison of group service is not possible due to variances in the number of households served, average house spacing, the number of regular pickups, the number of trash cans per household, and the number of bulk item pickups. However, when comparing Table 6 and Table 5, the advantages of group contracting versus individual contracting are evident.

Difficulties in comparing programs by group extend to obtaining costs passed on to the individual household. Some local governments do not break out trash costs on a line item basis in property taxes. The fee is often included in property taxes with charges for other services such as police. Other local governments have also increased the number of residential customers by providing trash service outside of local boundaries. The Cities of Newark and Dover do not break out trash service as a line item for their residents. The Newark Public Works Director was able to derive an approximate cost of \$13 per month per household. The City of Dover noted that it does provide service outside of city limits for \$12 to \$14 per month per household depending on customer location.

Kent County Levy Court currently offers its residents trash service when a trash district is formed. At the present time, there are sixty-two trash districts covering 5,702 households (14% of Kent's households). Kent County uses the contracting power of its districts to periodically solicit bids and obtain contracted service from a private hauler. Homeowners within the districts currently pay approximately \$14 per month (\$169.60 per year) for twice-a-week pickup. About \$18.80 of the annual fee is an administrative fee for Kent County to run the program. Potentially, the technique of group or cooperative contracting could be used in other areas.

**Table 6. 1999 Trash Collection Costs**

Group		# Trash Pickups / Wk	Cost / Mo / Household	# of Households 1990 census
Kent Co.	Kent County Trash Districts <sup>1</sup>	2	14.13	5,702
	Camden <sup>2</sup>	2	13.00	717
	Clayton	2	13.00	465
	Felton	1	10.00	247
	Harrington	1	11.70	912
	Milford <sup>3</sup>	2	16.50	2,405
	Smyrna	2	15.00	1,777
New Castle Co.	Arden Area <sup>2</sup>	2	13.70	464
	Newark	2	13.00	7,469
	Wilmington <sup>2</sup>	2	12.80	28,585
Sussex Co.	Georgetown	1	6.67	1,252
	Rehoboth Beach	2 1 (mid Jan - mid Apr)	9.16-10.41 Seasonal/Yr Round	670

Notes:

- <sup>1</sup> Kent County does not have trash service in all areas of the County.
- <sup>2</sup> Costs for Camden, the Arden Area (Arden, Ardencroft, Ardentown), and the City of Wilmington include existing curbside collection programs for paper.
- <sup>3</sup> Milford is actually located in Kent County and Sussex County.

Group contracting as a cooperative might be done by home owners associations and civic groups or by forming franchise districts similar to Kent County trash districts. Those living in areas where franchise districts are feasible could see a substantial reduction in their monthly bill by forming a district or cooperative unit and might add curbside collection of recyclables for well under their current rate.

Cooperatives may not be feasible in all areas based on density. A minimum number of 25 contiguous homes in a compact area with ascertainable boundaries is required by Kent County to form a trash district based on collection efficiencies. It is important to keep homes contiguous and close due to economic feasibility issues. Farms and businesses are exempt from Kent County districts. Sometimes, the farm exclusion makes it difficult to

place all homes in a district, as some areas do not have 25 contiguous homes within a reasonable collection area. (However when looking at curbside collection of recyclables only, haulers are looking for a minimum group size of 1,000 customers and for 5,000 customers optimally.)

More than 50% of Delaware households contract their services directly with a private hauler. In essence, this means that more than 50% of Delaware residents are not represented by a municipality for their trash services. Combined with cost tolerance of Delawareans, this fact presents a significant challenge if a statewide curbside recycling program were to be implemented, or if municipalities were required to meet waste diversion goals set by the State. This dilemma has been overcome in other states by establishing franchise districts, which provides counties or towns with the authority either to provide trash and curbside recycling services to its citizens or to contract for trash and recycling services on behalf of its citizens. The cost subcommittee has found that the cost of trash collection service is less in communities which have the ability to negotiate trash and recycling services for their residents than in communities where the individual must negotiate. The most relevant example of this disparity can be seen within Delaware's borders by comparing the cost of trash collection service for individuals and groups as discussed in Table 5 and 6.

A disadvantage of group contracting is that small private haulers may go out-of-business as they may be unable to compete with larger haulers for contracts. However, the additional cost for recycling services may be unacceptable in some areas unless trash costs can be lowered.

#### VIII. COSTS ASSOCIATED WITH THE WORK GROUP'S RECOMMENDATIONS

Establishment of Recycling Office within DNREC: In order to promote recycling and assist municipalities, an Office of Recycling within the Department of Natural Resources and Environmental Control (DNREC) has been proposed. The office would oversee an outreach/education program, assist municipalities, disseminate grants, and measure diversion. The office would include a 5 person staff: an administrator, an information/education officer, an environmental scientist, a planner, and clerical support. The outreach/education program would consist of media ads, editorials, mailers, web sites, school programs, and contact with groups such as civic associations, local governments, and haulers. The budget for the office will include operating costs for setup such as purchase of computers, furniture, and a vehicle as well as the annual cost of office supplies, contractual services, and travel. Anticipated costs of instituting and operating an Office of Recycling within DNREC (not including grants) are:

Salaries:	\$219,657 per year
Outreach/Education:	\$100,000 per year
Operating costs:	\$ 65,000 for first YR; \$25,000 for second YR; \$30,000 for third YR

An advisory council of public members would be formed to advise DNREC and the Office of Recycling. Their duties and responsibilities may include developing award criteria,

reviewing the grant/loan applications, and recommending long-term strategies for increasing residential and commercial recycling in Delaware.

Education and outreach programs: A separate subcommittee was formed to examine education and outreach programs. The Outreach Subcommittee has submitted information to the Work Group including cost data. In general, their findings are summarized below. For specific findings, please refer to their report.

A statewide education effort will be critical to the success of recycling. In order to achieve maximum participation, it is necessary to have the cooperation of all parties involved including the household members; political representatives; civic associations; incorporated and unincorporated municipalities; haulers; DSWA, DNREC and DEDO. It has been recommended that the recycling education effort be administered through a dedicated staff person in the proposed DNREC Office of Recycling. The education program will require working with the media as well as oral and written presentations. Oral presentations may be one on one or group presentations. Written presentation may include designing flyers and writing editorials. Office of Recycling staff should maintain communication with other recycling program efforts such as the Green Industries Program run by the Delaware Economic Development Office (DEDO).

The success and failure of recycling programs can be related to how intensive and ongoing the education effort is. Regardless of the size of the program recommended, a minimum of 20% of the budget on top of salary should be allowed to begin the public education program. After participation in the program is achieved, a lesser amount can be budgeted for ongoing outreach.

Grants/loans to local governments: Grants and loans would be given for the purpose of helping the recipient pay for the costs of developing and implementing waste reduction, reuse, and recycling programs. Loans would typically be used for infrastructure such as trucks. The anticipated amount of funding needed for grants/loans to local communities and governments is \$500,000 per year. Grant programs in other states vary in size and distribution.

EPA has awarded grants of varying magnitude to state governments for development of recycling programs. However, it should also be noted that Federal grant programs are continually being cut. In 1997, State of Colorado received \$236,000 in EPA grants for a Recycling Development Incubator Program to develop local markets to increase the use of recycle material in existing and new Colorado businesses. In 1998, Northeast Recycling Council received an EPA Region 2 grant of \$12,070 for a project to develop a model for estimating the environmental benefits of recycling for any geographic region. EPA also has a Jobs Through Recycling (JTR) Grant Program from which DEDO received a small grant.

Individual states have grant programs similar to the proposed program. Arizona has two grant programs associated with recycling: waste reduction assistance grants (\$500k) and waste reduction education grants (\$250k). Pennsylvania Department of Environment

Protection grant program has 5 types of grants: planning; recycling development and implementation; recycling coordinator; recycling performance; host municipality inspection; and independent permit evaluation. In FY 97-98, 760 grants totaling \$22.7 million were awarded to local governments. Massachusetts Department of Environmental Protection also has a statewide grant program. In 1999, two hundred nineteen (219) towns received small awards ranging from \$300 to \$142,000 for education materials, set-out containers and composting bins.

Enforcement of the Bottle Bill: Another subcommittee was formed to examine Delaware's Bottle Bill. The group's finding was that the Beverage Container Law is an important part of an integrated recycling program and that the bill should not be repealed. However, education and enforcement measures were suggested. DNREC should be provided with \$20,000 annually to conduct a pro-active compliance monitoring and enforcement program.

Product supply list: In order to assist in closing the recycling loop, DEDO should compile a list of local companies who currently have recycled-content products available. The list should be posted on the Internet and also made available to the public. Approximately, \$20,000 will be required to compile, print and distribute the list.

Recycle bins at all major events: One of the recommendations by the Work Group was to have 'Recycle Delaware' igloos located at major public events throughout the State. The cost of this concept depends on the number of igloos placed for each event. According to DSWA, a good rule of thumb is \$1,500 to \$2,500 per day per event for loading, unloading placement, delivery, pickup, and individual handling of the materials.

A more elaborate program may include a dedicated set of igloos, a specialized vehicle and trailer to transport the materials, and an additional staff person. Broken out these costs would be estimated at \$25,000 for the vehicle, \$10,000 for the trailer and \$25,000 to \$30,000 per year for staffing.

Increase the number of recyclables for igloo collection: Based on the survey, there is a interest among Delawareans in seeing collection of white paper and junk mail added to recyclables currently collected. In general, 'RECYCLE DELAWARE' cost increases would be proportional to the weight of the additional material collected at \$137 per ton. However, the average cost on a "per household" basis would increase if the number of households remains fixed. If the 'RECYCLE DELAWARE' program were expanded to include more materials, it may be necessary to expand the processing capabilities of the current intermediate processing facility located in New Castle County. The extent and cost of the upgrades to the facility as well as personnel needs would largely depend on the estimated quantity of materials and the types of materials targeted.

The recommendation by the Work Group to add paperboard, white paper and junk mail igloos at a 'Recycle Delaware' drop-off location would cost \$800/igloo or \$314,400 if three additional igloos were placed at all 131 centers throughout the state. The DSWA noted that adding more bins would be difficult, since space is very limited at a number of the sites.

The added igloos would conservatively double the amount of potential material collected and DSWA's current sorting production line is only capable of managing the existing recyclables. Therefore, an increase in staff and upgraded equipment would be needed to process the additional materials. The anticipated cost of the new equipment is estimated at \$750,000 to \$1,000,000. Collection and operational costs would increase by \$3,000,000 per year. On the revenue side of the equation, if 25% of the mixed paper and paperboard generated in the State's municipal waste stream were collected, 6,000<sup>1</sup> tons and 4,275<sup>2</sup> tons respectively, the end-processor could sell these materials for \$288,000<sup>3</sup> plus the paper board price.

<sup>1</sup> The amount of mixed paper which could reasonably be targeted from residences (includes books, magazines, telephone directories and third class mail, 24,000 x .25 = 6000) according to the 1999 report conducted by Franklin Associates, "Assessment of Solid Waste Discards in Delaware and the Potential for Recycling of Materials" (Table ES-3).

<sup>2</sup> Paperboard generated in Delaware is estimated at 17,100 tons/yr (not including corrugated, 17,100 X .25 = 4,275) according to the 1999 report conducted by Franklin Associates, "Assessment of Solid Waste Discards in Delaware and the Potential for Recycling of Materials" (Table ES-3).

<sup>3</sup> Mixed ONP/OMG (baled) is sold for \$48.00/ton based on revenue prices per ton of product at Delaware's Intermediate Processing Facility as of 12/99. The reader should note that the market for recyclables is in constant flux from year to year.

## Addendum to Cost Subcommittee Report

### **MUNICIPAL SOLID WASTE GENERATION, RECOVERY AND COST ANALYSIS**

Wilkinson 11/16/99; Updated 1/23/00

#### **Introduction**

The primary system for collecting recycle materials from Delaware households is the Igloo drop-off program run by the Delaware Solid Waste Authority (DSWA) under the "RECYCLE DELAWARE" trademark.. There are 124 Igloo locations throughout the state where residents can deposit waste material. The waste material is then transferred to the processing plant in New Castle County where it is prepared for sale. About 5% of the residential municipal solid waste (RMSW) is diverted from landfills by this program. DSWA also collects other materials for recycling at the three landfill sites. The total material from the two programs plus small amounts from the four municipal curbside programs diverts about 14% of the RMSW from Delaware landfills. Diversion, the percent of material recovered from the waste stream by recycling and composting, and program costs are the criteria by which recycling success is measured. Therefore it is important to analyze the "RECYCLE DELAWARE" program and programs in other states to understand the factors affecting recycling, diversion rates and program costs.

### Findings

- The Igloo program targets 30% to 60% less waste material for collection than curbside programs in other states. An increase in the number of materials, particularly paperboard, would increase the RMSW diversion rate.
- The collection of yard waste in Delaware contributes only 2% to the RMSW diversion rate. A more active collection could contribute 10%-15% to the diversion rate
- Household participation in the “RECYCLE DELAWARE” program is about 50%. Curbside programs in other states have participation rates of 80% to 90%.
- Recycling programs with the highest participation and collection rates involve municipal mandated curbside collection and/or volume based trash collection fees.
- Curbside recycling costs \$2 to \$3/household/month in high diversion rate municipalities. In general, the combined cost of recycling and trash collection in these areas is lower than before recycling was started. Drop-off programs cost \$0,70 to \$1.00/hh/mo. but diversion from the RMSW is lower.

### Selection of Waste Materials for Recycling

The Delaware municipal solid waste stream was estimated as 626,000 tons in 1997 by Franklin Associates (Reference 1). This report, issued in 1999, appears to be the only comprehensive report on waste generation in Delaware. The data were developed from EPA’s per capita waste data by adjusting for differences in Delaware demographics from national averages. Table 1 includes details from the 1999 report on the generation of waste in Delaware. Also included are data on materials selected for recycling programs and the recovery of materials from the “RECYCLE DELAWARE” program.

Residential municipal solid waste (RMSW) is about 60% of the total municipal waste stream. RMSW consists of 239,000 tons of product waste (household products and packaging that are discarded), 42,000 tons of food and miscellaneous waste and 91,500 tons of yard waste (grass, leaves and bush/tree trimming). The objective of recycling programs is to collect and reuse as much of these wastes as possible at an acceptable cost.

The number of waste materials that are selected for a recycling program is a major factor in the amount of recyclables that can be diverted from the RMSW stream and in the collection cost. The “RECYCLE DELAWARE” Igloo program, run by the Delaware Solid Waste Authority (DSWA) collects only 7 materials in most locations plus 3 materials in selected locations. This represents 20% of the RMSW stream as shown in the following Chart 1. Since only 23% of these materials are deposited in the Igloos, the RMSW diversion rate is 5%. Phoenix AZ selected 20 materials for their curbside program for a potential 39% advantage over the Igloo program at the same collection rate. Municipalities with high (top) RMSW diversion rates target up to 25 materials for a potential 57% advantage (Chart 2). The DSWA targets additional materials for the “RECYCLE DELAWARE” landfill drop-off program. The additional materials raise the potential collection by 60% over the Igloo program to a potential RMSW diversion (Igloo and landfill drop-off) of 43%. The actual diversion rate is only 12% however, because the participation and collection rate is low.

<b>Chart 1 – Summary of Table 1 Data</b>	Generated DE Tons	% of RMSW
Delaware Municipal Solid Waste	626,100	--
Residential Component (RMSW)	372,200	100
Household Waste (product waste – food waste)	238,800	64
Yard Waste (grass, leaves, bush/tree trimmings)	91,500	25
Household waste selected for Igloo collection*	73,800	20
- Selected by Phoenix AZ for curbside pick-up	102,300	27
- Selected for “top” curbside pick-up programs	115,200	31
- Selected by DSWA for Igloo and landfill drop-off collection	120,000	33
	Recycled DE Tons	
Recycled from Igloo collection by DSWA	17,100	5
Recycled in DE (Igluos, landfill drop-off, towns)	45,100	12
Recycled from “top” curbside programs	70,000-95,000	20-25
Yard waste composted by DSWA and DE towns	8,700	2
- Composted in “top” municipal programs	37,000-56,000	10-15

\* See Table 2 for a list of target material and comparison to other programs

Most high diversion rate municipalities and states have active yard waste collection and composting programs. This type program has the potential to add 10% to 15% to the Delaware RMSW diversion rate. The current “RECYCLE DELAWARE” program for composting material at the landfill sites is diverting only 8,000 tons of material or 2% of the RMSW. Composting adds 17-25 % to the diversion rate in other states.

<b>Chart 2 – Materials collected in Top Programs **</b>	Generated DE Tons
Household Product Discards	
Newspaper, Magazines	32,000
Paperboard	23,000
Glass Packaging	20,000
Steel and Aluminum Packaging	11,000
Junk Mail, Office & Other Paper, Bags	21,000
Plastic Packaging	6,000
White Goods, Other Durables	2,000plus
Total Household Product Discards	115,000
Yard Waste	91,500
Potential for Curbside & Compost Recycling Program	206,500

\*\* Extracted from Table 2

### Data Methodology

Waste generation data is difficult to obtain from cities and states with recycle programs. The report assembled by Franklin Associates for DWSA provides information not readily available in other places. To compare materials selected for recycling from

various programs, an assumption was made that generation is the same for a given waste in other areas as it is in Delaware. A list of materials collected in each program was obtained from EPA and state documents and assigned Delaware generation values. The data in Tables 1 and 2 and Charts 1 and 2 were developed in this way. The assumption should be reasonably accurate since the Delaware data were developed from EPA national averages.

It is recognized that some waste materials may deviate significantly from the average. Newspapers, for example, weigh much more in major cities than rural areas and since newspapers make up a large part of the recycle tons, achieving high diversion in these areas may be easier than in rural areas. Phoenix AZ may be such an example.

**Recycling Collection and Participation Rates.**

The collection rate of newspapers, magazines, and telephone directories in Delaware through the Igloo program is about 38% of the 32,300 tons generated whereas the collection rate of the other targeted material is only 8%. In Sussex County (Chart 3), the collection rate for newspaper is 53%. Collection of the total recyclables is also higher than the state average (33% vs. 23%). The higher rate in Sussex County may be related to the more visible and acceptable placement of the Igloos; essentially one per town. .

The collection rate statewide for newspaper is 38%, but it is only 14%, 13%, and 3% respectively for glass, cans and corrugated paper. The “RECYCLE DELAWARE” Igloo program would appear to be getting 40% to 50% of the Delaware households to save and deposit newspaper in the Igloos but not the other materials. This number agrees with the survey which indicated that about 50% of the resident had been to the Igloos in the last month. Getting residents to wash and save cans and bottles is apparently more difficult. The low number of Igloos for corrugated reduces the collection. Also, corrugated is hard to store in homes.

Chart 3 – Selected Data From Table 3

		<b>Total</b>		<b>Paper</b>	
		Tons	Diversion Rate	Tons	Diversion Rate
Delaware	Target	74,000		32,300	
	Collected	17,147	23%	12,400	38%
New Castle	Target	48,000 (a)		21,000	
	Collected	10,000(b)	21%	7,300	36%
Kent	Target	12,000(a)		5,200	
	Collected	2,400(b)	21%	1,700	32%
Sussex	Target	14,000(a)		6,000	
	Collected	4,700(b)	33%	3,200	53%

(a) Target tons based on population (b) Data from DSWA Collection Records

Collection rates in other areas are higher than in Delaware because both the participation rate ( 80%-90% vs. about 50%) and material recycled per household (about 2x

for Phoenix AZ) are higher. More recycle weight per household is related to the greater number of materials accepted for recycle in the curbside programs used in most of the recycling programs. The "RECYCLE DELAWARE" program is operated statewide whereas most programs cover a more limited and less diversified area. In this respect it is unique and, considering the diversified area, reasonably effective.

**Recycling Programs in Other States**

New Hampshire has 200 drop-off stations throughout the state, called transfer stations that now supplement the curbside recycling programs run by municipalities. The combination of the drop-off stations, curbside programs in many municipalities, composting and volume-based trash fees (Pay-As-You-Throw) are being used to achieve the 40% diversion goal set by the state in the late '80's. Dover NH is an example of a well run, high diversion rate program with 35% of the product waste and 17% of the yard waste being diverted from the RMSW. In addition, the program is run at a recycle cost of

**Recycling Programs in High Diversion Areas**

	Households	Type	Participati on	Diversion %	Recycle \$/t	Trash \$/ton
Leverett MA	650	Rural DO	na	30 Pro/23 Y	34.30	91.00
Crochett TX	3,293	Rural C	80%	20/32	181.90	62.41
Chatham NJ	3,285	Subur. All	80%	22/43	38.72	157.00
Dover NH	11,315	City C,DO	74%	35/17	74.69	114.58
Ann Arbor	46,000	Urban All	93%	29/23	95.42	85.58
Worcester	63,588	Urban C	na	27/27	54.06	96.00
Phoenix AZ	317,000	Urban C	80%	19/-	na	Na
DE state	275,000	Various DO	49%	12/2	137.00	Na
C=Curbside	DO=Drop- of	PU-Pickup	All-All three			

\$74.69/ton vs. a trash cost of \$ 114.58/ton. The total of these costs is less per household than the trash cost was before the program. However, one should not expect cost to go down with recycling. Other examples of successful programs are shown below and in Tables 6 and 7.

A number of test programs have been run which provide additional information. These are included in Table 5. In Concord NH, a test showed that the cost of a curbside program increases significantly as the distance increases between pickups. Therefore, curbside programs should be undertaken only in areas of concentrated households if cost is the primary factor. Tests have also shown that the cost/ton increases significantly when residents set out low quantities of recycle materials so programs involving only a few waste materials should not be used. Both of these factors increase truck cost.

Data from EPA (Figure 1) demonstrate the effectiveness of mandatory programs and/or volume-based trash collection fees (PAYT) on diversion rates in high diversion programs. Providing residents with the ability to manage their own waste not only increases recycling but reduces waste generation, thus lowering the total cost of trash removal and recycling.

### **Factors Affecting the Cost of Recycling**

Curbside recycling cost the average household \$2.53/mo in 13 of the high diversion areas listed in EPA's document, "Cutting the Waste Stream in Half". These cities vary from \$1.24 to \$5.04 but a range of \$2.00 to \$3.00 appears reasonable. These values are included in Table 7 along with the cost/month for compost and trash collection. For comparison, two drop-off programs are also included. As expected, the drop-off programs are less costly.

The \$2.53/mo is close to the \$2.85/mo that BFI charges for picking up recycle material in Salisbury MD and the \$2.16/mo they quoted Newark to pick up recycle material in that city in 1996 (Table 5). Both cities have about 8,000 households, well above the 5,000 households that BFI and Harvey and Harvey consider optimum. The minimum was given as 1000 households. No information was stated on the cost differential between the two levels. If the cost is higher in smaller towns, Kent County and Sussex County may face problems getting acceptance of curbside recycling. On the other hand, several of the HD (high diversion) areas are small and they are not the most costly on the HD list.

The cost of the drop-off program in Leverett MA is \$0.95/HH/mo, comparable to the \$0.72/ HH/mo. cost of the "RECYCLE DELAWARE" program. (Households are not directly charged for the "RECYCLE DELAWARE" program.) This gives us a direct comparison to curbside in Delaware. Curbside will cost \$2.00 to \$3.00/HH/mo. and drop-off will cost \$0.70 to \$1.00/HH/mo.

A cost of curbside recycling at \$2 to 3/HH/mo. would not be accepted in Delaware according to the recent survey of residents. However, if we focus on the total cost of waste management to the household, where recycle cost is one element with composting and trash removal the other two, the acceptability might change. Most of the HD cities had a net cost reduction to the households from lower residential municipal solid waste generation, greatly reduced tipping fees, and reasonable recycle revenues. Since these areas were able to achieve a HD rate while reducing overall waste generation, it is worth investigating how it was done.

One important element appears to be replacing two pickups of trash a week with one trash and one recycle pickup. This allows efficient use of trucks and personnel with little or

no added cost. This concept could be used in some areas of Delaware. Apparently, this method of operation has helped Salisbury adopt recycling with little additional cost.

Composting of grass and leaves adds 17% to 40% to the diversion rates in those areas considered above the normal. New Jersey's overall diversion is higher than Delaware's because of its composting rate (16% of RMSW vs. 2%). Composting also adds to reducing cost because the collecting and processing cost (\$/ton) is less than recycling or trash collection.

The number of materials in the recycle mix is larger in those areas with high diversion rates than the mix used by "RECYCLE DELAWARE" for Igloos. This increases the weight of material recycled by each resident and reduces the \$/ton for collection and increases the saving of tipping fees. The problem is in the separation of the materials for sale. Either the person using the material, the person collecting the material, the MRF (Materials Recovery Facility) or any combination must separate the recycle mix. Household separation is limited to 2 or 3 containers (Survey results). Curbside separation by the hauler is used but can be expensive. Co-mingle collection (the user places everything in one or two containers) and separation at the MRF appears the best and cheapest solution. Since paper is the highest volume item and returns good revenue when clean, having residents separate it from the other materials makes sense.

Increasing the materials in the mix is necessary to increase diversion significantly. The "RECYCLE DELAWARE" Igloo program is currently diverting about 23% of the mix they are targeting but the target mix is only 20% of the waste generated by residents. The mix used is 40% newspaper. If cities and towns in Delaware set up a curbside program to collect only paper or even add a few other items, the cost will probably be high for a limited gain (to the state) as was the case with the recycle test run by Newark in 1996 (Table 5). (Municipalities may be able to save money by reducing their tipping fees but DSWA will lose money on both tipping fees and cost of processing the recycle material. The cost to the state as a whole will be negative.) If we increase the materials in the mix to those collected by high diversion municipalities, we will need to collect the waste materials in a co-mingled system and separate them in a MRF. A new MRF will be needed to handle the processing of up to 100,000 tons. A state-of-the-art MRF such as the one in Phoenix AZ for 100,000 + tons could cost up to \$20 million. New markets for the added materials will be needed to keep the processing cost down.

A MRF and markets will require time to develop. In the interim, we could "beef" up the Igloo program and encourage greater use of the other drop-off facilities set up by DSWA. Whereas the Igloo program collects only about 17,000 tons of material, DSWA collects about 51,000 tons in all of their programs. Better siting for the igloos, a full complement of igloos at each site and adding more material to the mix (such as junk mail, office paper, paperboard cartons) would increase diversion throughout the state. Today, those residents using the Igloos are depositing a high percentage of the newspaper generated in the state but a small percentage of the glass and cans. Perhaps cleaning or the number of collection containers is a deterrent to collecting these items and an education program would

encourage greater use of the Igloos. DSWA collects leaves and grass for composting as well as other materials at the landfill areas. Usage of the facilities could be increased by education.

A different approach to trash collection and payment is volume-based trash fees (PAYT-pay as you throw). This is not recycling but a way to let households manage their waste. Those wishing to recycle, compost or reduce the materials they buy can reduce their waste cost. Those wishing not to reduce or recycle can continue as they currently do. PAYT seems a reasonable alternative to mandated curbside recycling or landfill bans and is being used more frequently in many places. There are problems with PAYT but these are being handled elsewhere. PAYT could be used with curbside recycling or a beefed up "RECYCLE DELAWARE". The latter would work because of the extensive network of Igloos in the state and the recognition of the program as effective by a majority of residents.

Variations in trash and recycle management in Delaware may negate a single solution. For example, 25% of the respondents to the survey said they have no curbside or alley trash pickup. There are many small towns and few urban areas. Municipal systems are used in many places, private haulers in others, some small, some large. All of these suggest one plan will not work for the state. Control of the program at the county or municipality appears to be the best alternative. All states have different areas that require different solutions for increased recycling. High diversion rates in some areas of a state do not mean high rates for the state as a whole. There are municipalities in New Jersey and New Hampshire that exceeds 50% diversion but the state diversion is lower. Test programs are needed to determine which system will achieve the goal in each area of Delaware.

The cost information in Table 7 is provided as \$/household/month. Cost is also calculated as \$/ton of waste or recycle material. As residents, we are most interested in the cost recycling will add to our monthly bills for trash collection. We are not too concerned with the cost to the state, municipality or the hauler. On the other hand, as solid waste managers, \$/ton is the guideline so both are provided in Tables 6 & 7. In addition, diversion rates, participation, tons and households are provided in Tables 6 & 7 for additional comparisons.

The information in this assessment is based on reports issued by Franklin Associates and EPA. There is reason to question some of the information. For example, the generation of yard trimmings in Delaware was 91,500 tons in 1997 according to the report by Franklin Associates. In the recent survey, only 35% of the residents indicated they put leaves or grass in the trash collection. If so, 65% are composting, considered source reduction by EPA and not included in generation. DSWA collected about 8,000 tons of yard waste in 1997. Is the 8,000 tons, 8.7% of 91,500 or 25% of the 32,000 ton remaining after household composting? It makes a big difference to the recycling program and the diversion rate.

#### **Program Elements and Expected Results**

The current generation and recovery of waste in Delaware has been discussed. Since waste is a function of population, it grows as the population grows. Achieving diversion rates set today will require more effort in the years to come. Table 8 is an attempt to determine the growth in waste and the tons that will need to be recovered to meet increasing

diversion goals. Assuming a goal of 40% that has been used in other states and program elements that have worked in more homogeneous areas, Table 8 lays out a timeline and conditions that may meet such a goal.

It will not be easy.

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Figure 1 - Volume-based Refuge Rates and Residential Recovery Levels

#### **Table 1 Residential Municipal Solid Waste and Recycle Mixes**

Data presented in Table 1 are based on information provided by Franklin Associates for waste generation in 1997. The 1997 data were developed for DSWA by Franklin Associates from EPA national averages of waste generated per individual in 1997 (per capita data). The EPA data are shown by major waste category in Table 1 under Column 1. The other columns are explained below:

- a. EPA data based on a population of 731,581 in 1997.
- b. Delaware municipal solid waste. Tons generated for each category of waste.

- c. Residential component of the Delaware municipal waste stream. Residential municipal solid waste is about 60% of the total waste. The remainder is listed in the right hand column of Table 1 as commercial MSW.
- d. Materials collected for recycling through the "RECYCLE DELAWARE" Igloo program. Data is provided by the DSWA in their annual report as categories, not specific waste materials. The 17,147 tons in Column d. represents a RMSW diversion of 5%.
- e. Generation data for materials that are collected in the Igloo program. Only about 32% are deposited in the Igloos. Compare Column d. with e.
- f. Generation data in Delaware tons for the materials which Phoenix AZ tries to collect in a curbside program.
- g. Generation data in Delaware tons for the materials collected in an average high diversion rate municipality.
- h. Materials recycled by DSWA in both the Igloo and landfill drop-off programs. The total of 51,000 tons is about 14% of the RMSW.
- j. Total potential for RMSW diversion when yard waste is added to the other programs.

### **Table 2 Recycle Mixes for Various Programs**

The list "Categories of Municipal Solid Waste" in Table 2 differs somewhat from the listing of waste materials in Table 1. EPA for some reason, change the categories for a later report. This listing is from the manual, "Cutting the Waste Stream in Half" issued in 1999. The tons of each waste generated in Delaware from Table 1 have been adjusted to match the categories of Table 2.

The various columns show the waste materials selected for several programs. The first column is the Igloo program. Note that only 10 items have been selected to date compared to 20-25 in other programs. Delaware, however, has more separations than the other programs. This provides a major cost advantage over most programs. The ( x ) indicates collection by curbside pick-up; the ( y ) is drop-off. Some programs use a combination of these systems.

Participation and diversion rates are shown at the bottom of the columns. The diversion rates of recycling and composting are additive. Ann Arbor MI recycles 30% and composts 23%, a diversion from RMSW of 53%.

The % at the top of each column represents the amount that newspaper/fiber contributes to the tons that are recycled in the program. Note that 71% of the Igloo recyclables is newspaper (plus magazines and telephone directories). Newspaper/fiber make up a high percentage of all programs. The term fiber is used here to cover all paper and paperboard. Most of the programs collect many types of paper products whereas Delaware collects only 3.

### **Tables 3 and 4**

Data presented in Table 3 are from DSWA records on collections from various Igloos. Records are not kept on the amount of material retrieved from each Igloo location but are

recorded by counties. Household data are from official documents as is the population data. The county waste data was generated from the data in Table 1 adjusted for the county population.

The survey data in the right column represents the participation of households in the Igloo program. The value was obtained by multiplying the percentage of people saying they were knowledgeable about the program by the percentage saying they deposited materials in the last month.

Data presented in Table 4 is essentially the same as that in Table 3 except for the cost data.

### **Table 5 Recycling Analysis – Test Program**

Data in the first two columns are from a program to collect newspapers by curbside recycling in Newark DE. The cost was estimated as \$183/ton for recycling vs. a cost of \$129/ton for trash collection. In preparing for the program, private haulers were asked to participate. BFI reportedly offered to pick-up recycle materials for a cost to the city of about \$106/ton if they could have a three year contract and collects from the entire city. BFI would have collected a greater weight of material and therefore would have had a lower cost.

The test run In Concord NH showed that the cost of recycling increases as the distance between houses increases. This is similar to the experience in Newark where the cost was high because the quantity/household was low. Both involve truck use and the cost associated with the trucks. It does point out that rural programs will cost more.

### **Tables 6 and 7**

Both Tables 6 and 7 provide cost data for recycling/composting programs. Table 6 provides program details also. Only two of the programs are drop-off programs; the others are curbside recycling. PAYT, landfill bans, and state mandated goals add incentive to most programs. The majority of the programs have a pick-up of trash and recycle material on a weekly basis, yet most are cheaper than trash pick-up in Delaware. Cost data are shown in \$/ton and \$/household/month. Many of the high diversion programs are cheaper than they were before recycling was started. This is attributed to the reduction in generated waste that occurs with PAYT and the reduced payments for landfill fees.

### **Table 8**

This table shows the growth of generated waste with population (time). As time progresses, more recycling/composting is needed to maintain a diversion rate, so meeting a diversion rate goal will require increasing effort as the population increases. More markets are needed to use the greater quantities of recovered material. New programs are necessary to achieved the higher diversion rate goals in future years. The table is a projection of possible programs and results.



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## Appendix G. Outreach Subcommittee Report

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### Report of the Outreach Effort Needed to Maintain a Successful Recycling Program

There is an undisputed consensus that a statewide education effort is critical to the success of any recycling program. In order to achieve maximum participation, it is necessary to have the cooperation of all parties involved. The major parties are:

1. People (Households)

This is the group that the major expenditure of resources needs to be devoted. The areas of focus should include:

- Connect recycling to larger issues of resource management and environmental protection.
- Participants may need to be "jump started" (possibly by a mandate or incentive) to get into the recycling habit.
- Give regular updates on progress; tell success stories of how some of the recycled materials are being used.

Vehicles to achieve this include:

- Flyers/Invoice mailers
- Newspaper Advertisements, Community Newspapers, Editorial Comments
- School Programs, Speaker Presentations, Public Events
- Information Hotlines (800#), Website
- Radio, Cable TV

2. Political Representatives

If any legislation is to be put into place regarding recycling, it is important to inform politicians in the initial stages of this effort. They are the group who will be called first by their constituents regarding any mandated program. This should be done by one on one communication from the Designated Recycling Person (DRP) from DNREC.

3. Civic Associations

There are many local groups that the people of Delaware are involved in that could help to educate:

- Community Groups, Girl/Boy Scouts, Church Groups, Garden Clubs, Environmental Groups, Umbrella Groups, Rotary Clubs

The vehicle used to reach this group should be a presentation to the group by the DRP.

4. Municipalities, Towns, Rural Areas (Counties)

It has been shown that many successful recycling programs are designed and managed by local communities. Each demographic area (from densely populated

cities to sparse rural areas) may have methods that work for their area, but not statewide. Also, there may be more of a sense of commitment for a recycling program that was designed by the people that participate in it. Outreach resources should be made available to each community to promote their own program.

5. Haulers

As business people, haulers look at recycling as a business factor and must have the economic reason to participate.

6. Delaware Solid Waste Authority

DSWA already has in place an extensive outreach program to fulfill their mission. However, a large part of their program includes education on the landfill system. It would be ideal if a newly instituted recycling effort in Delaware could "partner" with the 'RECYCLE DELAWARE' program.

7. DNREC

If a recycling program is administered by a Dedicated Recycling Office (DRO) within DNREC, it will be the primary responsibility of this Office to oversee the outreach effort. The person(s) dedicated to this task should be familiar with working with media and putting together presentations whether they are one on one, speaking to a group, designing flyers, and writing editorials. The DRO should maintain communication with other recycling agencies such as Green Industries to be able to reinforce the tangible positive aspects of recycling.

Budget

The success/failure of recycling programs are due in large part to how intensive and ongoing the education effort is. Regardless of the size of the program instituted, a minimum of 20% of the total budget should be allowed for public education. This effort must be maintained in order to achieve maximum participation.

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## **Appendix H. Beverage Container Law Subcommittee Report**

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**December 1, 1999**

The "Bottle Bill" Subcommittee met on November 22, 1999 to discuss the effectiveness of Delaware's 1984 Beverage Container Law, whether to keep it or repeal it, and if keeping it, how to make it more effective. Our initial report is as follows:

### **Subchapter III. Beverage Containers 6051 through 6062**

#### **Facts**

1. The Beverage Container Law covers any airtight non-aluminous container containing less than 64 ounces of a beverage under pressure of carbonation.
2. The law was enacted primarily for the purpose of reducing litter in the state. (The environmental community wanted to recycle or reclaim the beverage containers, the farm community wanted to rid farmland of beverage containers that damaged their equipment, and the school community wanted to rid the playgrounds of broken bottles that could be injurious to students.)
3. A refundable deposit system (5 cents per bottle) was set up to create incentives for the manufacturers, bottlers, distributors, retailers and consumers. All deposits are refundable, although they are not refunded unless the bottles are returned.
4. The law requires that 20% of the deposit amount, in addition to the deposit, be paid to the retailer by the distributor when the retailer returns bottles to the distributor.
5. No provision was written into the law for refund of container handling/disposal monies to the State.
6. A 1997 amendment made permanent the exemption on aluminum containers.
7. The law requires retailers to post a sign or shelf label in close proximity to any sales display of beverages in returnable containers, indicating the amount of deposit required for each container and that all containers are returnable.
8. The law requires consumers to empty the bottles before returning them by stating that a dealer or redemption center may refuse to refund deposits on

containers that are broken, or unclean or not empty. (Shortly after the Bottle Bill was passed, DNREC developed a regulation to implement the law. The regulation is very similar to the law but does provide clarification of some issues, including what is meant by the terms *unclean* and *not empty*. The regulation states: ". . . In order to be returnable, an empty beverage container shall be free of materials, such as paper, sticks and cigarette butts, other than the residue of the beverage." It further states that the container must not contain "a free flowing liquid." DNREC has interpreted this to mean that the container need not be rinsed, as long as all of the beverage has been removed, leaving only a small amount of residue.)

## Findings

1. The Beverage Container Law is controversial, with strong opinions for it from the environmental community and strong opinions against it from the beverage industry. (The environmental community wants to keep the law as a portion of an integrated recycling program; the beverage industry opposes it because they believe that it is not currently working well, it is detrimental to a comprehensive recycling program, and having multiple places to recycle (e.g., returnables, igloos, curbside) is confusing to the public).
2. There is a lack of knowledge and/or compliance, on the part of some beverage retailers, about their roles and responsibilities regarding the law. DNREC receives approximately 2 to 3 complaints per month from the public about retailers not accepting beverage containers. DNREC follows up on these complaints by contacting and educating the retailers about the law. There have been few second complaints, but when these occur, a DNREC enforcement person handles the complaint. Funding for ongoing education and proactive enforcement is not provided to DNREC; therefore, enforcement of the Beverage Container Law is not as high a priority at DNREC as public health issues.
3. There is a lack of knowledge and/or compliance on the part of the consumers about the law. According to PRC's August 1999 survey, 55% of Delaware residents typically purchase bottles that have deposits. Of these, 58% return the bottles for deposit. The reasons for not returning the bottles included "don't care about the money" (30%), "too much trouble" (39%), "take to Recycle Delaware igloos" (16%) "store doesn't take back" (9%), "not a Delaware item" (7%) and "no room to store" (3%).
4. There are no available measurements to calculate the percentage of beverage containers sold or refunded in the state. The beverage industry is strongly opposed to calculating this information, as it would involve sales data that is proprietary in this highly competitive industry.
5. There are not now, and never have been, any redemption centers. The law provided the means for such centers to be set up by the private sector (e.g., a group of retailers could get together and hire someone to operate a redemption center in their vicinity,

or a private entity could come in and set one up) but no one ever did this. We discussed the fact that aluminum-recycling centers are less plentiful than they once were; however, aluminum-recycling centers are not redemption centers as provided for in the law. Redemption centers would be for redeeming containers subject to the deposit (and other recyclable materials if desired). That's why every retailer that sells deposit containers is required to take them back.

### **Recommendations**

1. The committee agrees that the law does not appear to be working as well as it could. However, the majority of the group thought the law should be left in place as one component of an integrated recycling program, and that it should be publicized and enforced more to increase the recycling rate of beverage containers.
2. Encourage use of the bottle bill to increase the recycling rate of beverage containers by educating the public to return those containers for their deposit.
3. DNREC should be the agency responsible for increased public education and follow-up and enforcement. This stepped-up program will require funding. DNREC will identify the amount of funding needed. A funding source will need to be identified by the Work Group.



## **Appendix I. Acronyms**

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<b>DAS</b>	Department of Administrative Services
<b>DAWM</b>	Division of Air & Waste Management
<b>DEDO</b>	Delaware Economic Development Office
<b>DeIDOT</b>	Delaware Department of Transportation
<b>DNREC</b>	Department of Natural Resources and Environmental Control
<b>DSWA</b>	Delaware Solid Waste Authority
<b>EPA</b>	Environmental Protection Agency
<b>IPF</b>	Intermediate Processing Facility
<b>MRF</b>	Materials Recovery Facility
<b>MSW</b>	Municipal Solid Waste
<b>PAYT</b>	Pay-As-You-Throw
<b>PRC</b>	Pennsylvania Resources Council
<b>RD</b>	Recycle Delaware
<b>RFQ</b>	Request for Qualifications
<b>RSD</b>	Residential Solid Waste



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