

**THE BI-COUNTY
TEMPORARY STATE COMMISSION
FOR TAX RELIEF ON LONG ISLAND**

**MUNICIPAL
SOLID WASTE OPERATIONS
Operation and Plan**

Working Paper #3 - November 1991

NASSAU AND SUFFOLK COUNTIES
SOLID WASTE COMPREHENSIVE PLAN; A STRATEGIC SUMMARY

November 1991

The Bi-County Temporary State Commission
for Tax Relief on Long Island

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for Tax Relief on Long Island

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PREFACE

The enabling legislation establishing the temporary state commission set forth three distinct areas of inquiry:

1. The potential for cost savings which might be realized by the counties of Nassau and Suffolk, their cities, towns and villages through the coordination or consolidation of certain governmental agencies, their subsidiaries, or of their respective duties and functions including, but not limited to, (i) infrastructure construction, maintenance and rehabilitation, (ii) police and fire protection, (iii) purchase or acquisition of supplies and equipment, (iv) solid waste management, and (v) greater productivity in the use of existing resources;
2. the potential savings which might be realized through the consolidation of school districts, the sharing of school district services or functions among districts, and those changes necessary at other levels of government necessary to enable such steps;
3. existing revenue sources, their allocation, and the development, availability and desirability of alternative revenue sources.

This third working paper specifically addresses responsibility, 1.(iv).

It certainly was an astute judgement on the part of the New York State Legislature to recognize the significant importance of solid waste management in terms of its cost and tax impacts on municipal governments. In fact, the Commission's first working paper Municipal Government Operations, Revenues and Expenditures 1960-1990, clearly identified solid waste operations as the fastest growing expenditure item in all of the Nassau County and western five towns of Suffolk County during the past decade; and the single most costly function of municipal governments.

The cost of solid waste management is already approaching one-half of the total cost of municipal budgets and could easily pass this mark unless intelligent planning and implementation occurs.

This report addresses the collection, management, and disposal of solid waste on Long Island in order to achieve a reduction in the current tax burden wherever possible, and/or the development of strategies to at least contain or avoid increased costs.

The introduction identifies the general goals and objectives of the program followed by a summary discussion of current solid waste activities including waste generation, collection, incineration, residue disposal, ash reuse, and recycling. Solutions are suggested that are designed to contain or avoid costs through regional coordination and shifts of functional responsibility.

Nassau & Suffolk Counties
Solid Waste Comprehensive Plan: A Strategic Summary

INTRODUCTION

This plan is set forth to delineate the options and abilities of the Towns of Long Island to meet its solid waste management needs in either of two planning environments. They may prepare to manage solid waste in conjunction with each of the other planning units in the Long Island Region, recognizing and utilizing the benefits of shared facilities, a common economic base, and a single sole-source aquifer, or each town may take the steps which are necessary to preserve its ability to deliver this vital public service without reliance upon or assistance from any of its neighbors. All of Long Island has reached a crossroads in solid waste planning and must presently choose, under force of law and common sense, in which direction to proceed.

The New York Solid Waste Management Act of 1988 promulgated a prioritized strategy to manage solid wastes. In order of importance they are:

1. The reduction of the amount of solid waste generated.
2. The reuse of material for its intended purposes; or the recycling of recoverable wastes.
3. The generation of energy from solid waste that cannot be reused or recycled for either economic or technical reasons.
4. The disposition by land burial of solid waste that cannot

be reused, recycled, or converted to energy via shipment to external disposal sites or other methods that may be approved by New York State Department of Environmental Conservation (DEC).

New York State's action is a response, in part, to federal laws passed in 1965, 1970, and finally culminating in The Resource Conservation and Recovery Act of 1976, (RCRA). The major requirements of this Act were:

1. preparation of state solid waste management plans (SWP)
2. closure of open dumps
3. remediation of dump sites including capping
4. provision of funding and technical assistance by the Environmental Protection Agency (EPA)

The prime federal responsibility for the implementation of this Act was assigned to EPA's Office of Solid Waste (OSW).

The Act provided for:

1. elimination of open dumps
2. financial assistance to state and local governments
3. provision of technical assistance to state and local governments
4. involvement of citizens, industry, and government in planning and implementation
5. development of new approaches to resource conservation and recovery

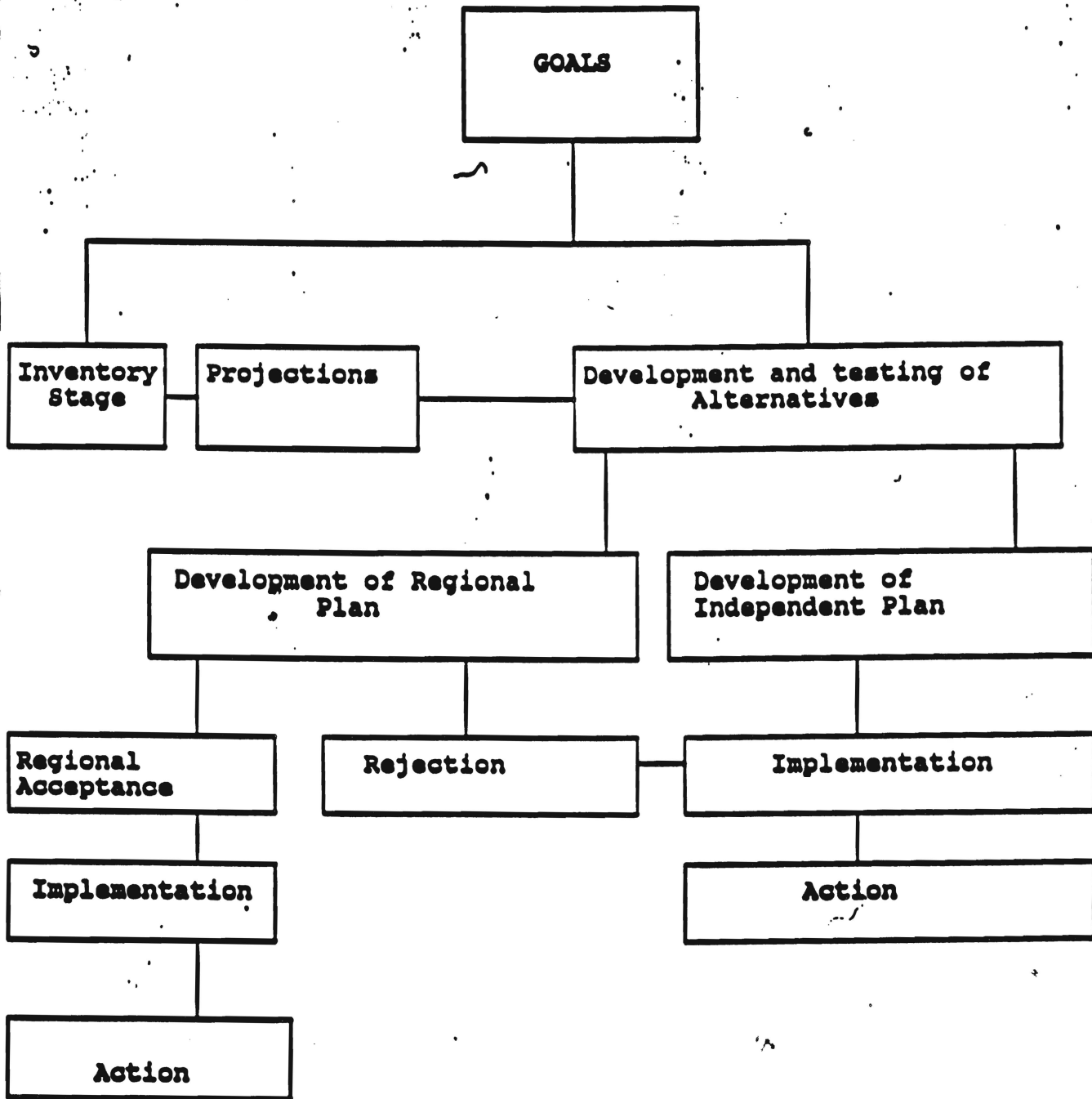
Despite the legitimate needs to manage what may well be the Nation's, New York State's, and Long Island's number one environmental problem--solid waste--little has been accomplished

by the Federal and New York State governments to meet the objectives of these laws. The major catalyst for action on Long Island was the passage of the 1983 New York State's Long Island Landfill Law. This statute was derived from recommendations in the Long Island Comprehensive Waste Treatment Management Plan (208 Plan) published by the Long Island Regional Planning Board in 1979. The major feature of the Landfill Law is that the use of landfills after December 18, 1990 is banned in all deepflow groundwater recharge areas as defined by the hydrogeological boundaries designated in the 208 Plan. All other landfills are also subject to the law, but provision is made for discretionary extension beyond 1990 by DEC if the municipality requesting an extension has an approved plan demonstrating reduced reliance on landfilling of untreated waste.

Aside from the lack of substantial financial support from the Federal or State governments to the municipalities, and aside from the inherent conflicting objectives of the various laws, several of the towns have moved vigorously to meet the spirit and intent of the law. The approach taken is that of utilizing linear systems analysis concepts as the model for planning. See Figure 1.

The dominant factor in solid waste planning for Long Island jurisdictions is the enforcement of the Long Island Landfill Law of 1983, which closed all active landfills in Nassau and Suffolk counties in December 1990, unless relief is granted by either/or the State Legislature and DEC. This report assumes that any such relief must come in the form of an inclusive regional approach to solid waste management, and further assumes that such a regional

**Figure 1
Planning Process**



approach is in fact a major goal of the Bi-County Commission in order to achieve maximum compliance and performance at minimal tax cost for the people of Long Island. The likelihood of success in formulating such an approach is questionable when considered in a historical context, but as will be shown within, the financial penalties imposed on each Long Island jurisdiction if such an approach is not implemented will be unprecedented.

The organization of this report generally follows the flow diagram, beginning with a statement of goals; then an inventory section that includes the amounts of solid waste currently generated by type, tonnage, and season. Current handling and disposal methods are also discussed. Population and future solid waste loadings are projected to the year 2000 in order to provide anticipated needs. Future facility requirement alternatives for composting, incineration, recycling, construction and demolition debris, and ash use or disposal constitute a major section of the report. This is followed by a discussion of cooperative regional opportunities and the anticipated benefits that should accrue to all the participants.

The concluding section contains a recommended implementation program, including a discussion of capital requirements, staffing, inter-town agreements, and projected revenue sources to insure the accomplishment of the plan's recommendations.

GOALS

The initiation of any planning process should include a declaration of the goals to be achieved as a result of planning. The statements may be simple, general and brief if the planners cannot be more definitive; or as comprehensive and detailed as the particular situation allows. The overall goals for municipal solid waste planning are set forth in the four strategies set forth in the New York State Solid Waste Management Act of 1988. Three of these objectives can be successfully addressed and planned for at the municipal level. The goal of reducing the amount of solid waste generated through packaging and other material uses is largely beyond the scope of local control.¹ In fact, some observers question whether any significant reductions can be achieved. Much has been discussed about reduction via packaging restrictions. To the extent this is possible it would certainly require legislation and persuasion at the Federal level. The encouragement of recycling such as Suffolk County and New York State's bottle return law has already achieved modest source reduction. However, the largest single component of municipal solid waste (MSW) is paper. The New York Times alone produces 4,000 tons of newspaper waste daily. Put another way, the

¹ Waste reduction in this sense is not equivalent to efforts to promote and encourage private sector recycling. Such efforts are within the scope of local control and are addressed herein. While commercial source recycling effectively reduces the volume of waste entering municipal facilities, it should not be confused with efforts to reduce waste products at the primary level, such as packaging restrictions, decreased reliance on disposables, or modifications to consumer goods to provide greater durability.

newsprint required for each Sunday edition of The Times amounts to approximately 100 acres of forest. If the future utilization of electronic news information becomes a partial substitute for print media, then society could achieve a significant reduction in generated solid waste. For the immediate future, solid waste planning, at least at the municipal level, must concentrate on the other objectives of recycling and reuse, energy generation and incineration. In the long term, educational efforts may result in behavioral modification relative to wastefulness as the first step in ameliorating the burgeoning amounts of waste products that ultimately must be dealt with in the most environmentally safe fashion.

A fairly definitive set of goals that represents the basis for a rational and least cost program includes:

1. maximization of environmental protection
2. minimization of total required incineration capacity beyond current facilities
3. maximization of recycling to achieve at least 50% levels
4. maximization of revenues to benefit residents for solid waste management
5. accentuation of regional cooperation to achieve economies of scale; broader recycling markets; greater efficiency in solid waste operations and use of facilities
6. minimization of out-of-town and off-island shipping
7. encouragement of private enterprise initiatives

Specific objectives can be identified to achieve these goals and, in fact, are a way of expressing goals in operational terms.

Table 1 is an expression of objectives listed in the left-hand column with a check off against these seven general goals.

Table 1
General Objectives and Goals Achieved

<u>Objective</u>	<u>Goals</u>						
	1	2	3	4	5	6	7
Find Commercial Uses for Compost	x	x	x	x		x	x
Secure Ash Reuse Testing and Approval	x		x	x	x	x	x
Identify Needed Additional Incinerator Capacity						x	x
Cap and Close Landfills	x						
Secure Regional Tire Recycling Facility	x	x	x	x	x	x	x
Secure Regional C&D Facilities	x	x	x	x	x	x	x
Secure Regional "Red Bag" Facility	x					x	x
Close Illegal Transfer Operations	x						
Create Regional Recycling Markets	x	x	x	x	x		x

SOLID WASTE MANAGEMENT ACTIVITIES

Current Volume of the Waste Stream by Type of Source

Until recently, few municipalities collected and tabulated solid waste data on a regular basis. Occasional ad hoc or short term information gathering efforts were usually related to the suspected dumping of out of town waste at the local landfill or the need to plan for a waste-to-energy facility. For this reason, many of the figures presented below reflect a combination of limited data and expert judgement.

Variations among the Long Island towns and cities in the local definition of Municipal Solid Waste (MSW), the methods used to obtain tonnage figures and the availability of reasonably accurate information respecting waste sources or waste stream composition have made it extremely difficult to develop useful estimates for anything other than total volume and per capita generation, as presented in Table 2. Figures for total annual waste generation have been provided by the respective municipalities or, where indicated, have been estimated by the staff. In some cases, the numbers are based upon actual deliveries to local landfills and transfer stations and have been used in calculating needed waste to energy facility capacity, volume of waste to be trucked off Long Island and reductions to be achieved through recycling.

MSW as defined here includes any non-hazardous, non-infectious solid waste generated within, and collected by or for a local jurisdiction or delivered to its waste disposal facility or

transfer station. On Long Island, MSW comprises residential, commercial and industrial waste; brush and grass clippings; some non-infectious hospital wastes; and, in the few towns that still accept it, construction and demolition debris.

The figures revealed a considerable range in per capita waste generation, with Long Beach reporting the lowest rate -- 0.88 tons per person per year; and Southold, the highest -- 1.51 tons per person per year. North Hempstead and Smithtown were second and third highest, with reported rates of 1.48 and 1.47 tons per person per year, respectively. Differences in the degree of affluence as indicated by the average annual income, in the extent of commercial and industrial activity, and in the level of construction activity -- especially if land clearing material is included in the tonnage data -- apparently account for a considerable portion of the variation in rates. Seasonal increases in resort area population also affect the per capita figures.

Data dealing with the percentage of the total waste stream by source is sketchy at best. Eleven municipalities provided the estimates of MSW by residential and by all non-residential sources combined, presented in Table 3. Five municipalities furnished fairly complete breakdowns. For four more municipalities, sufficient information was available either from the questionnaires or from supplementary data to allow the staff to develop estimates. Once again, there were similarities and differences among the reporting jurisdictions. As Table 4 indicates, six municipalities had already eliminated or severely limited the volume of

TABLE 2

Nassau and Suffolk Municipalities: Total and Per Capita Municipal Solid Waste

Municipality	1987		
	Population ^(b)	MSW (Tons per Year)	
		Total	Per Capita
Glen Cove	25,400	26,000	1.02
Hempstead	728,300	900,000	1.24
Long Beach	34,200	30,000	0.88
North Hempstead	217,200	322,000	1.48
Oyster Bay	304,300 ^(c)	337,500 ^(d)	1.11
Babylon	207,500	225,000	1.08
Brookhaven	394,600	550,000	1.39
East Hampton	15,500	21,200	1.37
Huntington	202,900	231,600	1.11
Islip	302,400	330,000	1.09
Riverhead	21,800	29,600 ^(e)	1.36
Shelter Island	2,400	3,100 ^(e)	1.29
Smithtown	118,100	173,500	1.47
Southampton	47,600	65,500 ^(e)	1.38
Southold	20,500	31,000 ^(e)	1.51

^(a) As received for municipal disposal

^(b) As reported in the LIRPB

^(c) Includes 39,000 persons in 14 north shore villages and the Glenwood-Glenhead Waste Collection District that send MSW to Glen Cove.

^(d) Includes 35,000 tons of MSW generated within the Town but delivered to Glen Cove.

^(e) Staff estimate

Source: LIRPB

TABLE 3

Nassau and Suffolk Municipalities: Annual Quantity and Percent of MSW by Source

Municipality	1987			
	SOURCE		SOURCE	
	Quantity (TPY)	Percent	Quantity (TPY)	Percent
	—Residential—		—Non-Residential—	
Glen Cove	23,400	90	2,600	10
Hempstead	621,000	69	279,000	31
Long Beach	25,500	85	4,500	15
North Hempstead	167,440	52	154,560	48
Oyster Bay ^(a)	180,000	60	120,000	40
Babylon	90,000	40	135,000	60
Brookhaven	291,500	53	258,500	47
East Hampton				
Huntington	125,100	54	106,500	46
Islip	198,000	60	132,000	40
Riverhead				
Shelter Island				
Smithtown	97,160	56	76,340	44
Southampton				
Southold	18,000	60	12,000	40

^(a) Figures exclude tonnage delivered to Glen Cove, for which no breakdown is available.

Source: LIRPB Survey

construction and demolition wastes accepted at local landfills or transfer stations. Construction and demolition wastes accounted for a very small portion of all MSW in Oyster Bay; but a more substantial portion in Hempstead, North Hempstead and Southold, where they accounted for 12, 11, and 15 per cent, respectively, of the waste stream requiring municipal disposal.

TABLE 4
Nassau and Suffolk Municipalities: MSW by Non-Residential Land Use or Activity,

<i>Municipality</i>	<i>Commercial-Industrial</i>		<i>Construction-Demolition</i>		<i>Landscaping</i>	
	<i>Volume</i>	<i>Percent</i>	<i>Volume</i>	<i>Percent</i>	<i>Volume</i>	<i>Percent</i>
Glen Cove	n.a.		n.a.		n.a.	
Hempstead		15		12		4
Long Beach	n.a.		*	*	n.a.	
North Hempstead		32		11		5
Oyster Bay		31		4		5
Babylon		54	*	*		6
Brookhaven	n.a.		*	*	n.a.	
East Hampton						
Huntington		32	**	**		14
Islip		24	*	*		16
Riverhead	n.a.		n.a.		n.a.	
Shelter Island						
Smithtown		19	5	**		20
Southampton						
Southold		10		15		15

n.a. = not available

*Disposal at municipal landfill prohibited

**Disposal limited to 5 yd.³ or less per load

Source: LRPB Survey, 1987; Town of North Hempstead DGEIS, 12/1/85 and 3/86, respectively; Town of Huntington DEIS, 5/86; NYS Environmental Facilities Corporation DGEIS for the Long Island Regional Ashfill.

The proportion of MSW attributed to commercial and industrial activities varied from as little as 10 percent in the east end Town of Southold to as much as 54 percent in Babylon. The proportion represented by landscaping or garden wastes, apparently of both residential or non-residential origin, ranged from a low of 4 percent in the Town of Hempstead to a high of 20 percent in the Town of Smithtown.

More recent information obtained through direct contacts with the municipalities or from environmental impact statements and other public documents suggests that between 80 and 85 rather than 90 percent of Glen Cove's waste stream is of residential origin and that the remaining 15 to 20 percent is generated by commercial and industrial establishments. The City has also indicated that it does not accept any construction or demolition debris. Brookhaven has estimated that its current waste stream averages 1,800 tpd or 657,000 tpy including land clearing and construction and demolition debris, which account for roughly 15 percent of the total.

Collection Systems

Most Nassau municipalities depend on municipal pick up to a greater extent than do their Suffolk counterparts. The latter tend to place considerable reliance on private carters, not only for the handling of industrial and commercial waste collection but for residential waste collections as well.

As indicated in Table 5, four municipalities -- all of them in Nassau -- relied primarily on municipal pick ups. Six Suffolk towns depended on private carters licensed by the municipality for

from 65 to 100 percent of the local collections. Five bi-county towns hired private carters to pick up from four to 50 percent of the waste. Homeowner deliveries to the landfill accounted for a very small percentage of the town's total MSW except in the semi-rural east end municipalities, where it accounted for as much as 35 percent of the waste in the case of Riverhead and over 50 percent in East Hampton.

TABLE 5
Nassau and Suffolk Municipalities: Percentage fo Total MSW Delivered,
By Type of MSW Delivery System, 1986

<i>Municipality</i>	<i>Municipal Pick Up</i>	<i>Carter Hired by Municipality</i>	<i>Private Carter Licensed by Municipality</i>	<i>Generator Delivery to Landfill</i>	<i>Other</i>
Glen Cove	85.0				15.0 ^(a)
Hempstead	65.0	4.0	31.0	>1.0	
Long Beach	100.0				
North Hempstead	16.0	37.0			47.0 ^(b)
Oyster Bay	50.0	10.0	39.5	0.5	
Babylon			100.0		
Brookhaven		18.0	72.0	10.0	
East Hampton				<50.0	
Huntington	17.0		75.0	2.0	6.0 ^(c)
Islip	9.6 ^(d)	50.4 ^(d)	40.0 ^(e)		
Riverhead			65.0	35.0	
Shelter Island					
Smithtown	25.0		70.0	5.0	
Southampton					
Southold			75.0	25.0	

^(a) Private carters hauling commercial waste.

^(b) Carters hauling commercial waste, 32%; Town, County, State Trucks and Special Permits, 15%.

^(c) Contractor, landscaper and other small truck deliveries to landfill.

^(d) Residential waste only.

^(e) Non-residential waste.

Source: LRPB Survey

Babylon has recently changed its collection arrangements. The Town has assumed responsibility for municipal collection of MSW and has contracted with a consortium of carters that provides townwide pick up services.

Waste-to-Energy Facilities

Four waste to energy facilities have begun operation. Three plants, previously identified as planned, have been delayed by litigation; two are under construction; others appear to have been scaled back or abandoned in the hope that "low tech" disposal programs or legislative dispensation will miraculously solve the solid waste problem. Table 6 summarizes the most recent Long Island waste to energy facility information as of January, 1991. There are now five operating facilities with a total rated or nameplate capacity of approximately 4,000 tpd.² Construction of the proposed North Hempstead and the Oyster Bay facilities and completion of construction of the Huntington facility, with an additional unit to process Smithtown's waste, could add another 3,000 tpd of capacity by 1995. Construction of a Town of Brookhaven plant to serve its own needs and, possibly, those of the east end towns could add still another 1,200 to 1,500 tpd of capacity soon thereafter. If the Town of Islip were to build a second 500 tpd facility, as originally contemplated, Long Island

² Nameplate or rated capacity differs from available capacity. The former represents the design throughput with no allowance for interruptions for routine maintenance or emergency repairs. The latter, a more useful number for planning purposes, represents design capacity as reduced by the need to shut down operations for normal or emergency maintenance activities.

would eventually have close to 9,000 tpd of installed capacity.

TABLE 6
Long Island Waste-to-Energy Facilities

<u>Municipality</u>	<u>Status</u>			<u>Type</u>	<u>Rated Capacity</u> <u>TPD</u> ^(a)	<u>Air Pollution Control Equipment</u>		
	<u>Completed</u>	<u>U.C.</u>	<u>Planned</u>			<u>ESP</u>	<u>Scrubber</u>	<u>Baghouse</u>
Glen Cove	x			Mass Burn Co-Disposal	250 ^(a)	x		
Hempstead	x			Mass Burn	2,319		x	x
Long Beach	x			Mass Burn	200	x		
North Hempstead			x	Mass Burn	990		x	x
Oyster Bay			x	Mass Burn	1,000		x	x
Babylon	x			Mass Burn	750		x	x
Brookhaven			x x ^(b)	Mass Burn	1,400 350			
East Hampton ^(c)								
Huntington-		x		Mass Burn	750		x	x
Smithtown			x ^(d)		250		x	x
Islip	x			Mass Burn	518		x	x
			x ^(e)	Mass Burn	500			
Riverhead ^(f)								
Shelter Island ^{(c)(f)}								
Southampton ^(f)								
Southold ^{(c)(f)}								

^(a) Includes 25 TPD (10%) for co-disposal of sewage sludge.

^(b) Additional capacity required if two or more east end towns contract with Brookhaven

^(c) No facility contemplated

^(d) Bi-town agreement covering joint recycling and incineration will necessitate construction of additional capacity at Huntington to handle Smithtown MSW.

^(e) Additional 500 TPD may be constructed as originally planned.

^(f) Arrangements for combustion at regional facility under consideration.

Source: LIRPB

At the present time all of the municipalities that have reached a decision as to incinerator technology have chosen a mass burn rather than a refuse derived fuel process. Without the exception of the recently proposed facility in the Town of Brookhaven, differences in plant size generally appear to be related to a population and current estimated waste generation.

Three out of the five facilities now in operation, the two under construction and the one in advanced planning rely or will rely on a combination of dry or semi-dry scrubbers and baghouses, an advanced system for the control of air emissions. The two smallest plants, both currently in operation, employ conventional electrostatic precipitators.

Estimated Quantities of Residue

Knowledge of the amount of residue available for use or requiring disposal is essential for planning purposes. Good baseline estimates not only aid in the identification of near term ash generation but serve as the foundation for the calculation of residue quantity projections during the planning period.

Since neither the survey responses nor follow up contacts could provide data that were sufficiently consistent or reliable to justify their use or extrapolation, the LIRPB developed its own estimates for the municipalities that have, are building or are planning to build waste-to-energy facilities. For purposes of estimation and projection of residue, it is assumed that all facilities described in Table 6 will be constructed and in operation by 1995 or shortly thereafter; population growth will occur as indicated in the current LIRPB projections and recycling programs will not affect residue quantities.

To the extent that plans for proposed facilities are abandoned or that the facilities actually constructed are smaller than originally anticipated, both the estimates and the projections may be expected to overstate the quantity of residue requiring use or disposal.

Table 7
Nassau and Suffolk Municipalities: Estimated Maximum Residue Generation

Municipality	Municipal Solid Waste (a)		Facility Capacity		Anticipated Residue at 80% Available Capacity											
			Nameplate Tons/Day	Available Capacity Tons/Day	Combined Ash (100%)				Bottom Ash (85%)				Fly Ash (15%)			
					Tons/Day	80%	25%	30%	Tons/Year	25%	30%	Tons/Day	Tons/Year	25%	30%	Tons/Day
Glen Cove City (b)	227.9	83,200	250	200	50.0	60.0	18,250	21,900	43	51	15,513	18,615	8	9	2,738	3,285
Hempstead Town	2,465.8	900,000	2,319	1,855	463.8	556.6	169,290	203,140	394	473	143,897	172,669	70	83	25,394	30,471
Long Beach City	82.2	30,000	200	160	40.0	48.0	14,600	17,520	34	41	12,410	14,892	6	7	2,190	2,628
North Hempstead T.	882.2	322,000	990	792	198.0	237.6	72,270	86,720	168	202	61,430	73,712	30	36	10,841	13,008
Oyster Bay Town	828.5 (c)	302,400 (c)	1,000	800	200.0	240.0	73,000	87,600	170	204	62,050	74,460	30	36	10,950	13,140
Nassau County	4,486.6	1,637,600	4,759	3,807	951.8	1,142.2	347,410	416,880	809	971	295,299	354,348	143	171	62,112	62,532
Babylon Town	794.5	290,000	750	600	150.0	180.0	54,750	65,700	128	153	46,538	55,845	23	27	8,213	9,855
Brookhaven Town - Eastern Towns	1,940.8	708,400	1,750 (d)	1,400	350.0	420.0	127,750	153,300	298	357	108,588	130,305	53	63	19,163	22,995
Huntington - Smithtown Towns	1,109.9	405,100	1,000 (e)	800	200.0	240.0	73,000	87,600	170	204	62,050	74,460	30	36	10,950	13,140
Islip #1	904.1	330,000	518	414	103.6	124.3	37,810	45,380	88	106	32,139	38,573	16	19	5,672	6,807
#2			500	400	100.0	120.0	36,500	43,800	85	102	31,025	37,230	15	18	5,475	6,570
Suffolk County	4,749.3	1,733,500	4,518	3,614	903.6	1,084.3	329,810	395,780	768	922	280,339	336,413	136	163	49,472	59,367
Bi-County Region	9,235.9	3,371,100	9,277	7,422	1,855.4	2,226.5	677,220	812,660	1,577	1,893	575,637	690,761	278	334	101,583	121,899

(a) Based on data in Table 2.

(b) Glen Cove co-disposes MSW and sludge at the same facility. It also processes approximately 51,000 TPY of MSW from north shore villages and waste collection districts that currently contract with Glen Cove.

(c) Excludes MSW delivered to Glen Cove.

(d) Includes capacity for east end towns.

(e) Includes capacity for Smithtown.

Note: The sums of the columns do not equal the printed totals due to rounding.

Source: LIRPB

The estimates, which are found in Table 7 are presented as a range rather than a single number. Uncertainty as to the appropriate rate for ash generation suggests such a course.

Six assumptions underlie the calculations in Table 7.

- . On an average daily or annual basis, available capacity can be expected to equal 80 percent of the nameplate or rated capacity of the facility.
- . The amount of MSW processed at the various Long Island facilities will equal but not exceed available capacity as defined above.
- . Whatever excess capacity exists at any of the facilities will be used to process by-pass from other Long Island waste-to-energy facilities as well as commercial and industrial waste collected by private carters throughout the bi-county area.
- . Recycling of processible components of MSW will have little or no effect on the amount of waste incinerated. Waste generation is increasing nationally and on Long Island, and accurate quantification of potential waste and ash reductions through voluntary or mandatory recycling is not possible at this time. Inasmuch as a maximum ash generation or "worst case" scenario is most appropriate for planning purposes, it has been assumed that reductions achieved through recycling will merely offset increases in per capita waste generation. Additional assumptions relating to recycling are described in the section on ash quantity projections.
- . The quantity of ash generated can be expected to equal between

25 and 30 percent, by wet weight, of all MSW processed at the waste-to-energy facilities. Differences in the moisture content of the ash can be expected to affect the weight. It is possible that the use of generic rather than facility-specific residue production rates to calculate ash quantities may tend to overstate ash generation, since the generic rates fail to account for the "bottle bill factor". It appears that as a result of this legislation (Environmental Conservation Law, Sec. 27-1001), in New York State as much as 0.1 lb. of glass per capita per day never becomes a part of the processible MSW. To the extent that pre-collection removal of this glass reduces the non-combustible fraction of the waste stream, it also affects the quantity of ash produced. An LIRPB analysis of the potential impact suggests that the bottle bill, theoretically, could reduce the estimated generation rates from 25 to 23 and from 30 to 28 percent of MSW processed. However, since there is uncertainty respecting consumer behavior now and over time, and since there is not yet long term facility-specific experience that can be considered typical of Long Island, the use of the generic rates is regarded as appropriate.

- . The residue is expected to consist of 85 percent bottom ash and 15 percent fly ash. These numbers are based on today's best available mass burn technology and pollution control practices and are therefore also subject to change.

Examination of Table 7 indicates that at maximum capacity, Nassau and Suffolk Counties could produce an average of roughly

1,850 to 2,250 tpd of residue requiring use or disposal when the five existing facilities, the facilities under construction and those in various stages of planning are all in operation. Absent changes in population and waste generation rates, it is expected that the residue or combined ash will consist of approximately 1,575 to 1,900 tons of bottom ash and 280 to 335 tons of fly ash per day, seven days a week. In an average year, the two counties will have to use or dispose of some 677,000 to 813,000 tons of combined ash or 576,000 to 691,000 tons and 102,000 to 122,000 tons of bottom ash and fly ash, respectively. Since the volumetric equivalent of one ton of residue is estimated at one cubic yard, land disposal of the ash would require 693,500 to 839,500 cubic yards of landfill or ashfill capacity per year.

The table also indicates that on a County-wide and regional basis, the total quantity of MSW produced by Long Islanders currently exceeds the estimated available capacity of existing and proposed facilities. It is anticipated that recycling and composting will suffice to offset any shortfalls in combustion capacity as well as the continuing growth in the waste stream.

Current Residue Disposal Plans

An updated summary of the municipal responses to the query concerning residue disposal arrangements or plans is presented in Table 8.

TABLE 8
Nassau and Suffolk Municipalities: Residue Disposal Plans, 1991

<u>Municipality</u>	<u>Responsibility</u>	<u>Disposal Site(s)</u>
Glen Cove	Operator	Buffalo, N.Y.
Hempstead	Town	Ohio, Brookhaven.
Long Beach	Vendor	Ohio
North Hempstead	Operator	Town ashfill
Oyster Bay	Vendor	Pennsylvania
Babylon	Town	Town ashfill
Brookhaven		Town ashfill
East Hampton	n.a.	n.a.
Huntington-Smithtown	Vendor	Virginia
Islip	Town	Off island landfill & Town ashfill
Riverhead		
Shelter Island	n.a.	n.a.
Southampton		
Southold		

Source: WAFPS

It is interesting to note that in every case for which information is available, the city or town has placed the burden of ash disposal upon the vendor or facility operator with the exception of Hempstead, Islip and Babylon. Inasmuch as the cost of residue handling is reflected in the tipping fee, utilization rather than disposal is obviously in the municipal interest.

The effect of the siting constraints imposed by the Long Island Landfill Law (ECL Sec. 27-0704) as well as the Legislature's failure to specifically exclude ash monofills from the provisions of the Law is clearly evident in the listing of off-island sites for the disposal of a considerable portion of the bi-county area's ash.

Planned Recycling Activities

New and expanded recycling activities can be expected to affect both the quantity and composition of the MSW to be processed

at waste-to-energy facilities and of the residue. The removal of different kinds of waste through source separation and recycling can be expected to have varying impacts on the operation of the facilities and on the quantity and quality of the ash.

Initially, the establishment of a recycling program and the selection of the items to be covered reflected a local desire to reduce the quantity of MSW rapidly filling up the little remaining landfill space or requiring export to off-island landfills. The incentive was almost entirely economic. Programs often represented a crisis response, designed to achieve maximum reductions as quickly as possible with minimal inconvenience to residents.

Today, the situation has changed. New York State's decreased willingness to support waste-to-energy as the primary tool for MSW management, its great enthusiasm for waste reduction and recycling, and its apparent determination to convert an ambitious State Waste Management Plan goal of 50 percent recycling into a statewide standard is forcing municipalities to develop more comprehensive, relatively sophisticated, mandatory programs.³

The rapidly evolving nature of the recycling programs and the occasional difficulty in separating existing and proposed activities have complicated data collection and the assessment of the impact of recycling on ash quantity and quality. Table 9,

³ The New York State Solid Waste Management Plan originally called for a 50 percent reduction in the waste stream requiring incineration or landfilling. Forty percent was to be achieved through recycling and 10 percent through waste reduction. The goal has been raised to 60 percent in the 1990 Plan Update.

which is based upon the information provided in survey questionnaires, State Environmental Quality Review Act documents, a March 1989 Status Report prepared by the Recycling Unit of the Suffolk County Department of General Services and follow up calls, indicates that all of the towns and cities are collecting or accepting newsprint and that most are also accepting other paper as well. Most municipalities require or plan to require the source separation and recycling of glass, cans, white goods and other metals. Nearly all have indicated that they accept waste oil, and at least ten provide for or plan to provide for the separation and composting of yard waste.

There is considerable uncertainty regarding the near term effectiveness of these and other recycling programs in reducing the quantity of MSW that must be landfilled or combusted. Imbalances, such as those between the rapidly increasing supply of newsprint and the limited secondary material processing capacity or the needs of overseas users, or that between the supply of ferrous metals and the demand for steel products, have severely limited access to some secondary materials markets. In some cases, municipalities have found it necessary to incinerate or landfill source separated items ostensibly intended for recycling.

Composting of yard waste may have a more immediate but seasonal impact on the waste stream. The process, although not without problems, is relatively simple and inexpensive; and, more often than not, local public agencies may be able to use most, if not all, of the product for the next several years.

The effect of recycling on the quantity and quality of the ash will depend on the particular items eliminated from the waste stream. The removal of a large portion of the paper will have relatively little effect on ash quantity; however, it can be expected to have an adverse effect on the BTU content of the waste. At the same time, the removal of newsprint, magazines and other glossy printed materials may have a beneficial effect through the reduction of some of the heavy metal concentrations in the residue. Significant reductions in the glass component of the waste stream may help to extend the useful life of plant and equipment but can be expected to affect the utility of the ash as a construction aggregate material. It can be expected that the removal of glass and ferrous metal from the MSW will alter the composition of the ash and the results of environmental leachate testing. Table 10 summarizes the individual recycling activities for each town.

TABLE 9
Nassau and Suffolk Municipalities: Summary of Recycling Activities

<i>Municipality</i>	<i>News print</i>	<i>Other Paper & Cardboard</i>	<i>Glass</i>	<i>Cans</i>	<i>White Goods & Other Metals</i>	<i>Oil</i>	<i>Construction Debris</i>	<i>Tires</i>	<i>Plastic</i>	<i>Leaves & Yard Waste</i>
Glen Cove	M									
Hempstead	V		V	V		V				
Long Beach	M				M	V				
North Hempstead	M	V	M	M	M	V		M	P	V
Oyster Bay	M	V	M	M				M		V
Babylon	M	V	M	M	M	M		V	P	P
Brookhaven	M	V	P	P	P	V			P	V
East Hampton	M	M	M	P	V	V		V		V-P
Huntington	M-V	M-V	M-V	M-V	M-V	V		V		V-P
Islip	M	M	M	M	M-V	V			P	M
Riverhead	V	V	V	V	V	V		V	V	V
Shelter Island	V				V			V		
Smithtown	M	M	M	M	M			V	P	P
Southampton	M	M	M	M	V			V		
Southold	M								V	P

M - Mandatory

P - Planned

V - Voluntary

Table 10
NASSAU COUNTY RECYCLING PROGRAMS

General Information	Town of Hempstead	Town of North Hempstead	Town of Oyster Bay	City of Long Beach	City of Glen Cove
Contact Person	Ellen S. Krimmer, Esq. Recycling Coord. Town of Hempstead Dept. of Sanitation 1600 Merrick Rd. Merrick, NY 11566 (516) 378-4210	Rand Burgner Deputy Exec. Dir. of Solid Waste Mgmt. Town of N. Hempstead 220 Plandome Rd. Manhasset, NY 11030 (516) 627-0590 ext. 2292	Anthony J. Maurino Deputy Commissioner/ Environmental Control Town of Oyster Bay 150 Miller Place Syosset, NY 11791 (516) 821-7347	John Febbo Environmental Planner Dept. of Public Works Room 500 1 W. Chester St. Long Beach, NY 11561 (516) 431-1000 ext. 216	Robert Mangan Director of Public Works City of Glen Cove City Hall Bridge St. Glen Cove, NY 11542 (516) 676-4167
Establishment of Program	Since March, 1988	Since December 1, 1986 (newspaper)	Since April 13, 1987	Since June, 1987	Since January 23, 1989
Program Name	Recycling is Fundamental (R.I.F.)	None	Separate Oyster Bay's Recyclables Today (S.O.R.T.)	None	Recycling Program
Goals	Environmental Protection/Reduce disposal cost. Recover and reuse as much of waste stream as possible	Recover and reuse as much of the MSW stream as possible	Recover & reuse as much of the MSW stream as possible	Reduce waste stream Get community into recycling for future efforts	Environmental Protection Recover and reuse as much of the MSW stream as possible
WASTE STREAM INFORMATION					
Total MSW	700,000 tons	363,000 tons	246,627 tons	25-35,000 tons/year	20-25,000 tons/year
Total Tonnage Recycled	77,952 tons	22,580 tons	27,548 tons	3,000 tons	1,925 tons
RECYCLING PROGRAMS INFORMATION					
Mandatory Source Separation with Curbside Pick-up	Yes	Yes	Yes	Yes	Yes
Coverage	Townwide	Townwide	Solid Waste Disposal District (75,000 homes)	Citywide	Citywide

Prepared by: J. Hartnett, Town of Huntington (1989 statistics)

Table 10

General Information	Town of Hempstead	Town of North Hempstead	Town of Oyster Bay	City of Long Beach	City of Glen Cove
Sector	Residential, condos, apts, commercial in near future	Residential and part commercial	Residential	Residential, Condos, & Apartments	Residential & commercial in near future
Materials Collected	Glass, metal cans, bulk metal, scrap metal, newspapers/magazines	Glass, newspapers, cans Pilot Plastic Recycling Program	Newspaper, cans, bottles junk mail, Christmas trees & auto tires	Newspaper, magazines, phone books, bulk metal, glass bottles, metal cans & aluminum	Newspaper, glass, aluminum, plastics or food products and corrugated
Incentives for Participation	None Free recycling container	None	Tax savings Free recycling containers	None	None
Penalties for Nonparticipation	None	Possible suspension of Refuse Collection	Fine and/or suspension of refuse collection	Void garbage pick-up	In City's recycling ordinance
Voluntary Drop-off Program	Yes-scrap metal, waste oil, auto batteries, grass clippings, auto tires (non-commercial) bulk metal	Yes	Yes for waste oil, auto batteries, auto tires	Yes	Yes
Drop-off Sites	(1) At closed landfill, will have (1) at Merrick F.D.	13 sites - Voluntary & Town landfill	N.A.	1 at Resource Recovery Facility	1 at Public Works Yard
Items Accepted by Program	Glass, metal cans, waste oil, auto batteries, grass clippings, auto tires (noncommercial), scrap metals, newspapers, magazines, bulk metal	Batteries, used motor oil	Auto batteries, auto tires, waste oil, Christmas trees, advertising mail, bottles, cans & office paper	Plastics, bulk & white metal	Newspaper
S.T.O.P. Program	Will use Nassau County	Yes (11 scheduled sessions)	Yes	Soon. Waste oil just began	Yes
Educational Programs	Elementary, Middle and high school programs, Recycling education directed to general public and civic associations. Earth Day activities	Senior Citizens groups, Civic groups, Elementary and High School programs	Programs for Schools K-6	Earth Day activities Environmental Awareness Campaign, Oral & Slide presentations to Civic groups organizations & schools	Elementary, Middle, High School Programs, Civic & social organizations, newsletter & public info
Population	737,900	218,624	309,302	36,000	27,000
Tipping Fee	\$70/ton	\$66/ton	\$80/ton	\$70/ton	\$85/ton

Table 10

Information	Hempstead*	North Hempstead	Oyster Bay	Long Beach	Glen Cove
TONNAGE					
ONP	35,556 (Westbury)	15,000 (Rutigliano)	27,548 (combined ONP & mixed bottles & cans)	1,750 (Westbury)	1,265
Glass/Metal	9,944 (Omni)	5,000 (Omni)		600 (Omni)	300
C&D	N.A.	N.A.	35,412	N.A.	N.A.
Plastic	N.A.	31 (Wellman)	270	50 (Nat. Waste Tech)	104 (Nat. Waste Tech)
Scrap Metal	21,834 (Cousins)	2,500 (Cousins)	20	N.A. (Mid Island)	N.A.
Auto Batteries	52	N.A.	20	N.A.	N.A.
OCC	N.A.	N.A. (Westbury/ Rutigliano)	N.A.	N.A.	N.A.
Waste Oil	62(Akba)	1	15 (Akba)	N.A.	N.A.
Office Paper	N.A.	N.A.	N.A.	N.A.	N.A.
Compost	4,872	N.A.	4,628	100	350
Used Tires	N.A.	Pilot Program Metropolitan Rubber, Inc. & other company	270 - Through Town of N. Hempstead under joint agreement	N.A.	N.A.
Other	2,631.4	N.A.	63 - Christmas trees	N.A.	N.A.
Size of Container	12.5 gallon, green container	10 gallon orange container	20 gallon yellow rubber maid container	12 gallon, red (rectangle) container	11 gallon blue (square) container
Service Type	Municipal Service	Contracted and Municipal, Village Service	Municipal & Contracted Service. Majority Municipal Service	Municipal service	Municipal City Service
Days: Recycling Refuse	1 day recycling 3 days refuse	Varies 26 unincorporated villages Town run districts	1 recycling day (varies) 2 refuse days	Tues: West End Wed: East End Thurs: Broadway & Shore Road	Recycling day varies 2 refuse days
Tipping Fee for Recycling Refuse	None	None	None	None	None
Compartmentized Recycling Vehicles	Labrie	Varies as to service area Compaction vehicles	Labrie 31 cubic yard	Yes	Yes

*Pilot Program in 1989 Expanded Townwide

Table 10
SUFFOLK COUNTY RECYCLING PROGRAMS

Information	Babylon	Huntington	Brookhaven	Smithtown	Southampton
Contact Person	Barbara Fitzpatrick Recycling Coord. Dept. Env. Control 281 Phelps Lane N. Babylon, NY 11703 (516) 422-7640	James A. Hartnett Director Solid Waste Management 100 Main Street Huntington, NY 11743 (516) 351-3295	Elaine McKibbin Supvr. of Solid Waste Management Town of Brookhaven 3233 Route 112 Medford, NY 11763 (516) 451-6222	Andy Wolke Supt. of Sanitation and Recycling Smithtown Town Hall P.O. Box 575 Smithtown, NY 11787 (516) 269-6600	Brian Gilbride, Sanitation Supvr. Town of Southampton 116 Hampton Road Southampton, NY 11968 (516) 283-5210 or East End Recycling Assoc. (516) 283-6000 x293
Establishment of Program	October 1, 1987	July, 1987	Established 35 Refuse and Recycling Districts. Mandatory since January 1, 1989	September, 1987	April, 1987
Program Name	RECYCLING: Babylon's Common Cause	SORT: Separation Our Recyclable Trash	CURB: Clean Up Recycle Brookhaven	SCRAP: Smithtown Comprehensive Recycling Action Program	Club Recycle
Goals	25% of Municipal Solid Waste by 1992, 40% by 1997	Reduce the amount of of Huntington's Solid Waste entering the landfill through comprehensive Solid Waste Management	Recover and recycle 40% of the MSW by 1992	Retrieve 500 tons per week of recyclables from total MSW	Reduce amount of MSW stream entering the landfill
WASTE STREAM INFORMATION					
Total MSW	271,000 tons/yr.	262,000 tons/yr.	493,000 tons/yr.	128,500 tons/yr.	69,000 tons/yr.
Total Tonnage Recycled	18,190 tons/yr. of residential waste only	35,801 tons/yr.	14,790 tons/yr.	18,786 tons/yr.	3,000 tons/yr.
Population	213,000	204,000	423,000	126,000	50,000*
Recycling Programs Information	1 - Curbside 2 - Voluntary 3 - Composting	1 - Curbside paper & mixed recyclables in all districts 2 - Bulk white goods 3 - Corrugated 4 - Composting	Curbside: Newspaper, bottles, cans - by August, 1990	Curbside commingled	1 - Curbside commingled newspapers 2 - Self haul 3 - Office paper, 44+ locations (5 eastern towns)
Mandatory Source Separation with Curbside Pick-ups	Yes	Yes Mandatory Districts I, II Voluntary Districts III	Yes	Yes	Mandatory as of December, 1989
Coverage	Townwide	Townwide	Townwide	Townwide	Townwide effective December, 1989

Prepared by: J. Hartnett, Town of Huntington (1989 statistics)

*increases to 150,000 during summer.

Table 10

General Information	Town of Babylon	Town of Huntington	Town of Brookhaven	Town of Smithtown	Town of Southampton
Sector	Residential & Business	Residential & Business	Residential & Business	Residential, Multi Dwellings & Commercial	Residential (some commercial office paper)
Materials Collected	Newspaper, bottles, metal cans & plastic	Yard waste, commercial, corrugated, newspapers, glass, metals, & plastics	Newspapers, glass, bottles (metal cans by August, 1990)	Bottles, newspapers, & cans, corrugated & junkmail	Newspapers, cardboard, glass & metal cans
Incentives for Participation	None	None	None	Delivery of garbage cans. Free dinners & Tee shirts.	Considering prices & other promotional incentives.
Penalties for Non Participation	In Town's Solid Waste Ordinance - fines	In Town's Recycling Ordinance - warnings & fines	Fines & Community Service for non-compliance of Town Ordinance	None	In consideration
Voluntary Drop-off Program	Yes	Yes	Yes	Yes	Yes
Drop-off Sites	Recycling Hanger & 13 mini drop-off igloos (metal, glass, plastic, & used motor oil)	Town landfill at East Northport & Recycling Center, Huntington (4) mini drop-off sites	3 Drop-off sites for newspapers	Separation Facility (Drop-off site)	3 Transfer Stations at the landfill
Items Accepted by Program	1 - Newspapers, metals, glass 2 - Drop-off same as above plus auto batteries, magazines, used motor oil, auto tires & plastic 3 - Leaves for compost	1 - Newspaper & magazines, metal, glass 2 - Drop-off same as above plus used motor oil, plastic bottles, used car & household batteries 3 - Yard waste for compost	Glass, newspapers, leaves, ashes, used motor oil, scrap metal, car batteries	cans, corrugated, glass, metals, newspapers, used batteries & used motor oil	Newspapers, glass, cans cardboard, plastic containers, scrap metal, tires, and used motor oil, aluminum, heavy metal, clothing, batteries (car & home), leaves
S.T.O.P. Program	Yes	Yes	Yes	None	Yes
Educational Programs	Full time Recycling Educator for elementary schools. General public education, civics, information center, direct mailings to residents, commercial seminars	Recycling education taught in elementary through high school level and also directed to general public & civic organizations. Full time Recycling Educator in schools & civics. Faculty field trips available.	General public & school educational program presented by an Educational Specialist	Information & publicity by Town Official to schools, civic groups & direct mailings to residents	East End Recycling Assoc. (E2RA) (5 Town Recycling Corp.) to schools and civic groups 263-6000 x293 or 548-8128

Table 10

General Information	Town of Babylon*	Town of Huntington	Town of Brookhaven	Town of Smithtown	Town of Southampton
Glass	Omni Tech Cost \$29/ton for sorting commingled recyclables	E.W.G. - Picked up: Clear (\$20/ton) Brown (\$15/ton) Green (\$8/ton)	E.R.R.L Varied price each type	E.W.G. Glass Recovery Recycling Corp.	E.W.G. Glass Clear (\$15/ton) Brown (\$10/ton) Green (\$5/ton)
Paper	Westbury Paper (\$35/ton)	Island Recycling (\$27/ton)-Picked-up (\$22/ton)-Delivered	Jet Paper (\$15/ton) Sorting Fee	Prins Recycling Kelby Street Fort Lee, NJ	Island Recycling (\$22/ton) Pinnacle (N/C)-Delivered Office paper-New York Paper N/C
Cans	Omni Tech is paid \$29/ton for sorting commingled recyclables	1 Franza \$2.50/ton 2 EWG - mixed recyclables	CRInc of NY Starting August, 1990	Franza's Universal Scrap Metal Farmingdale, NY	1 Gershow \$10/long ton 2 Jet Sanit. N/C 3 M&M Scrap 20¢/lb
Waste Oil	J&K No charge	General Waste Oil AB Oil Service	A&B Oil Varied	A&B Oil	Strebel's Ladry, Inc. Wethampton Beach N/C
Plastics	Omni Tech pays \$46/ton for sorted PET & HDPE containers	National Waste Technology EWG (mixed recyclables)	Starting January, 1991	National Waste Technology	George's East End Recycling N/C
Recyclable Breakdown (Tonnage)	Corrugated/ *Commercial: 10,000 Newspaper: 9,142 Glass: 1,880 Aluminum: 63 Ferrous Cans: 564 Automobiles: 5,200 White Metal: 166 Plastic: 2 Waste Oil: 29 Auto Batteries: 9 Leaves (Highway Department): 1,000 Tires: 50 tons	Newspaper: 14,384.1 Corrugated: 1,728 Office Paper: 83.5 Scrap Metal: 1,850 Glass: 920 Metal Cans: 373.1 Plastic: 64 Yard Waste: 13,610 Woodchips: 2,745.8 Waste Oil: 28.6 Batteries: (Car & Household): 13.5 Tires: N.A.	White Metal: 3,438 Iron: 72.78 Aluminum: 11.24 Auto Batteries: 54.7 Highgrade White Paper: 13.1 Newspapers: 12,291.4 Glass: 54.8 Waste Oil: 117.6 Metal Cans: 84 Tires: N.A.	Paper: 12,915 Corrugated: 1,699 Scrap Metal: 3,821 Glass: 266 Aluminum: 9 Plastic: 47 Batteries: 29 Waste Oil: 39 Yard Waste: N.A.	ONP: 1,282 OCC: 420 Scrap Metal: 952 Glass: 286 Metal Cans: 40 Plastic: 68 Batteries: 15 Used Oil: 2,480 Yard Waste: N.A. Tires: 111 Office Paper: 2 tons

*Town ordinance commercial carters report recycling tonnages to TOB DEC

Table 10

General Information	Town of Babylon	Town of Huntington	Town of Brookhaven	Town of Smithtown	Town of Southampton
Metal (Scraps)	Gershaw Recycling of Medford	Franza's Universal Scrap Metal Farmingdale, NY	Gershaw Recycling of Medford	Franza's Universal Scrap Metal Farmingdale, NY	M&M Scrap (\$22/ton)
Corrugated	Westbury Paper	Island Recycling N/C	N/A	Prins Recycling Fort Lee, NJ	Island Recycling N/C Delivered
Plastics	Omni-Tech	National Waste Tech N/C	N/A	National Waste Tech (7/15/90)	George's Sanitation N/C
Used Tires	Metro Rubber \$1/tire	N/A Landfill Only - Residents Only	New York Tire	Landfill Only - Residents Only	Conn. Tire \$1.10/tire
Size of Container	20 Gallon Blue Pail with Lid	12 Gallon Blue Container	20 Gallon Red & Orange	20 Gallon Orange Pail	None
Service Type	Contracted Service	District 1 & 2 Municipal District 3 - Private Contracted to Town	Private Contracted Service 35 Districts	Private Contracted Service	Private Contracted & Public Drop-off
Days Recycling Refuse	1 Day - Recycling on Wednesday 2 Days - Refuse Inc. Village - Recycle Every Day	1 Day - Recycling on Wednesday 2 Days - Refuse	1 Day - Recycling on Wednesday 2 Days - Refuse	1 Day - Recycling on Wednesday 2 Days - Refuse	Recycling 1st & 3rd Thursday 2 Days - Refuse
Tipping Fee For Recycling	No Tipping Fee for Recycling	No Tipping Fee for Recycling	No Tipping Fee for Recycling	No tipping Fee for Recycling	No Tipping Fee for Recycling
Tipping Fee Refuse/Rubbish	\$78/ton	\$40/ton	\$45/ton	\$2/cu yd for Commercial (open roll-off)	\$25/ton

Table 10

General Information	Town of Islip	Town of Southold	Town of East Hampton	Town of Riverhead	Town of Shelter Island
Contact Person	Elizabeth Gallagher Commissioner Julia Noeldechoen Recycling Coord. Environ. Control 401 Main Street Islip, NY 11751 (516) 224-5640	Jim Bunchuck Sanitation Supvr. 53 5 Main Blvd. Southold, NY 11971 (516) 734-7685	Dave Paoelli Sanitation Supvr. Town of E. Hampton 159 Pintigo Road E. Hampton, NY 11937 (516) 324-7191	John Reeve Sanitation Supvr. Riverhead Town Hall 200 Howell Avenue Riverhead, NY 11901 (516) 727-8194	Frank Kleniwicus Supt. Hwys & Public Works or Ed Walsh 12 S. Ferry Road Shelter Island, NY 11964 (516) 749-1090
Establishment of Program	Since 1981 70 Districts & Barner Beach Districts	Recycling activities have been carried out for the past 11 years	Pilot Program: Sept. 15, 1987	Since 1975	N.A.
Program Name	WRAP: We Recycle... America... and Proudly	Southold Recycles	Extensive Municipal Solid Waste Recycling System	Riverhead Recycles	Shelter Island Recycles
Goals	50% of Town's Solid Waste (MSW) stream	Improve quality and reduce quantity of materials entering the landfill	Utilize composting and recycling to reduce waste stream by 65%	55% by 1993	N.A.
WASTE STREAM INFORMATION					
Total MSW	391,356.9 tons/yr.	43,000 tons/yr.	26,208 tons/yr.	42,212 tons/yr	3,000 tons/yr.
Total Tonnage Recycled	700 tons/wk. & 1,300 tons/wk. yard waste	2,462 tons/yr	1,840 tons/yr.	N.A.	N.A.
Population	306,000	21,000*	16,000*	22,000	2,500**
Recycling Programs Information	Curbside collection mixed, recycling, yard waste, bulk white goods	Voluntary drop-off curbside collection of newspapers, plastic containers, cans, glass by color	Voluntary drop-off	Voluntary drop-off	Voluntary drop-off
Mandatory Source Separation with Curbside Pick-up	Yes	None	Mandatory as of June, 1990	None	None

*increases in summer

**increases to 12,000 during summer season

Table 10

General Information	Town of Islip	Town of Southold	Town of East Hampton	Town of Riverhead	Town of Shelter Island
Coverage	Townwide	None	Townwide, effective June, 1990	None	None
Sector	Residential & Business	Residential, commercial office paper	Residential & Commercial	None	None
Materials Collected	Glass, newspaper, cans, cardboard, batteries, mixed paper, yard waste	Glass by color, cans, plastic containers, newspaper	Food garbage, paper & cardboard, cans & glass bottles, Household Hazardous Waste & Plastic Containers	None	None
Incentives for Participation	Prizes, report of participants in local newspaper	None	Considering prizes & other promotional incentives	None	None
Penalties for Nonparticipation	Warning note & fines	None	In Town's Recycling Ordinance	None	None
Voluntary Drop-off Program	Yes Residential & Commercial	Yes	Yes	Yes	Yes
Drop-off Sites	Sayville Recycling Center, Lincoln Ave., Holbrook	Town landfill in Cutchogue	Town landfill	Town landfill in Baiting Hollow	Town landfill
Items Accepted by Program	Newspapers, glass, metals, corrugated & scrap metals, plastic, used motor oil, Drop-off batteries, yard waste with grass	Newspapers, glass, cans, plastic, scrap metal, tires, batteries, used motor oil, office paper, cardboard, leaves	Newspapers, glass, cans, cardboard, plastic, tires, used motor oil, steel	Newspapers, glass, cans, cardboard, plastic, scrap metal, batteries, used motor oil	Newspapers, plastic, scrap metal, tires, used motor oil, cans
S.T.O.P. Program	Yes	Yes	Yes	Yes	Yes
Educational Programs	Recycling Education taught in elementary & high school - also directed to general public regents approved curriculum developed for use in elementary school, Full-time educator in schools, civics	East End Recycling Assoc. (E2RA) Funds/ State designated person (Robert Amer) or Town officials (into schools) direct mail flyers, public service announcements	Direct mail & local TV East End Recycling Assoc.	East End Recycling Assoc. flyers, newsletters, public service announcements	Mainly direct mail East End Recycling Assoc. flyers, newsletters, public service announcements

Table 10

General Information	Town of Islip	Town of Southold	Town of East Hampton	Town of Riverhead	Town of Shelter Island
Glass	Pace Glass, NJ (\$25-\$35/ton)	E.W.G. Glass Clear (\$15/ton) Brown (\$20/ton) Green (\$8/ton)	E.W.G. Glass Clear (\$15/ton) Brown (\$10/ton) Green (\$8/ton)	Mattinuck Sanitation N/C	N.A.
Paper	Jet Paper (\$10/ton)	Jet Paper (\$30/ton - wet) Pinnacle Ind. (\$30/ton - dry)	Pinnacle Ind. N/C through 2/91	Jet Paper N/C	BP Wreckers, Ltd. Southold, NY (No fee)
Cans	Gershow Recycling of Medford	PK Scrap N/C	\$175./40 yd roll off	Mattinuck Sanitation N/C	
Waste Oil	ASM Oils Corp., NY	Strebel's Ladry, Inc. Westhampton Beach N/C	Strebel's Ladry, Inc. Westhampton Beach N/C	Strebel's Ladry, Inc. Westhampton Beach N/C	Strebel's Ladry, Inc. Westhampton Beach (20 gal.)
Plastics	TRI-MAX, Inc. Ronkonkoma, NY	Georges Sanitation	TRI-MAX, Inc. Ronkonkoma, NY	N.A.	N.A.
Recyclable Breakdown (Tonnage)	1989 ONP 15,350 OCC 927 Glass 209 Aluminum 29 Ferrous 1,631 Yard Waste 54,684 Plastic N.A. Used Motor Oil N.A. Metal Cans 1,660 Office paper N.A. Batteries N.A.	ONP 425 OCC N.A. Glass N.A. Aluminum N.A. Scrap Metal N.A. Yard Waste N.A. Plastic N.A. Used Motor Oil 1,425 Metal Cans 548 Office paper N.A. Batteries 18 Household 2	ONP 294 OCC 140 Glass 45 Aluminum N.A. Scrap Metal 1,339 Yard Waste 5,420 Plastic N.A. Used Motor Oil N.A. Metal Cans N.A. Office paper N.A. Batteries 2	ONP 166 OCC 19 Glass 7 Aluminum N.A. Scrap Metal 6,488 Yard Waste 469 Plastic 4 Waste Oil 64 Metal Cans 2 Office paper N.A. Batteries 4	ONP N.A. OCC N.A. Glass N.A. Aluminum N.A. Scrap Metal N.A. Yard Waste N.A. Plastic N.A. Used Motor Oil N.A. Metal Cans N.A. Office paper N.A. Batteries N.A.
Metal (Scraps)	Crestwood Metals & Gershow Recycling of Medford (\$10-\$700/ton)	Franza's Universal Scrap Metal Farmingdale, NY (\$5.01/ton)	N.A.	Gershow Recycling of Medford (\$6/ton)	1 North Fork Sanitation (\$105/trailer) 2 BP Wreckers, Ltd. 510 Vennecott Drive Southold, NY 3 Michael Mjuscce 17 Bello Pond Rd. Hampton Bays, NY
Corrugated	Island Recycling N/C	George's Sanitation	George's Sanitation N/C	George's Sanitation N/C	N/A
Plastics	\$125/ton	George's Sanitation N/C	George's Sanitation N/C	George's Sanitation N/C	N/A

Table 10

General Information	Town of Islip	Town of Southold	Town of East Hampton	Town of Riverhead	Town of Shelter Island
Used Tires	\$65/trailer	New York Tire \$90/trailer	New York Tire \$1.00/tire	None	New York Tire \$1,650/110 yd trailer
Size of Container	20 Gallon Beige & Green Pail	None	None	None	None
Service Type	Contracted Service Municipal Mandatory Curbside	Price Contracted & Public Drop-off	Recycling Drop-off at Landfill	Drop-off	Drop-off None - 90% Mandatory Commercial - 90% Howeowners - 10%
Days Recycling Refuse	1 Day - Recycling on Wednesday 2 Days - Refuse 1 Day - Separate Collect Yard Waste	1 Day - Recycling 2 Days - Refuse Recycling Drop-off	No Recycling 2 Days - Refuse	Recycling Drop-off	Only Drop-off for Residents
Tipping Fee For Recycling	No Tipping Fee for Recycling materials separated unless mixed & yard waste (\$18/ton)	No tipping Fee for Recycling and leaves	No Tipping Fee for Recycling	No Tipping Fee for Recycling	No Tipping Fee for Recycling
Tipping Fee Refuse/Rubbish	\$40 ton	Nonhazardous household Garbage \$40/ton Brush/Construction, Sand & Sod, Tree Stumps Agricultural Debris, Shellfish, Sludge \$2 per year self hauler	Brush (410/cu yd) Construction \$3.50/cu yd Per Appliance - \$5 Per Car - \$25	\$40 ton commercial \$2 per visit for self hauler	Residential - None Construction - \$25/yd Brush - (\$15/yd) \$25 per ton commercial \$40 per year self hauler garbage sticker

Ash Quantity Projections

The ash quantity projections differ from the estimates in that they represent an attempt to account for temporal changes in facility capacity and for the implementation and effectiveness of pre-burn and post-burn recycling of wastes contributing significant components of the residue. In order to proceed in a systematic fashion and to maintain the ability to revise the projections to reflect future developments, the staff has made the series of assumptions listed below:

Facility Capacity

- . Facilities now in operation, together with those under construction or at an advance stage of planning, will be generating ash before the end of 1995. These include existing waste-to-energy plants in Glen Cove, Hempstead, Long Beach, Babylon, and Islip (Plant No.1) and plants under construction or in advanced planning in Huntington, Oyster Bay and North Hempstead.⁴
- . There may be additional facilities serving Brookhaven and the small east end towns, as well as additional capacity in Islip by the year 2000.
- . All of the above mentioned facilities will remain in operation during the projection period and will function at available capacity. The current estimated average annual MSW tonnage requiring disposal exceeds planned available capacity in each

⁴ At the present time North Hempstead and Brookhaven have abandoned commitments for construction.

of the counties and in the region as a whole. Given that fact and the fact that the per capita generation rate is increasing, it is considered likely that there will be sufficient MSW to keep all facilities operating at approximately 80 percent of rated capacity.

- . There will be no significant changes in facility capacity between 2000 and 2010.

Recycling Programs

- . All municipalities will collect and market of glass, tin cans, plastic and aluminum.
- . A reduction in the quantity of processible waste delivered to the facility as a result of the removal of glass, tin cans and aluminum will result in an equal tonnage reduction in the quantity of ash generated.
- . The recycling of newsprint can be expected to have relatively little effect upon the amount of residue, since all but a very small fraction of the total quantity is destroyed in the combustion process. The recycling of other paper products, while somewhat more difficult to accomplish, could result in greater reductions in ash quantities, depending upon the amount and component mix removed from the waste stream. Given the fact that the largest town has not indicated plans to recycle other paper, the uncertainties as to total quantity and component mix and the relative insignificance of potential residue "savings" as compared with those to be realized from the recycling of glass, tin cans and aluminum, the calculation

of ash reductions associated with the recycling of newsprint and other paper has not been attempted at this time.

- . Under the best circumstances; that is, with maximum municipal effort and close to 100 percent public participation, recycling programs could achieve the following "savings" or removals of glass, tin cans and aluminum from the MSW stream.

Glass	0.3 lbs. per capita per day
Tin Cans	0.1 lbs. per capita per day
Aluminum	0.015 lbs. per capita per day

- . As previously indicated, an additional 0.1 lb. of glass per capita never becomes a part of the MSW since it consists of bottles returned to the retailer or distributor pursuant to the New York State Bottle Law (ECL. Title 10. Sec.27-1001). Approximately 0.005 lbs. of aluminum per capita per day is also privately recycled by Long Island residents and, therefore, never becomes a part of the MSW.
- . The per capita rate for tin cans includes a small amount of ferrous material removed prior to incineration. It appears likely that an additional 0.2 lbs. per capita of other ferrous metal can be removed following incineration, thus further reducing the quantities of ash requiring use or disposal.
- . The success of recycling efforts can be expected to vary from municipality to municipality and within a municipality over time. Inasmuch as it is not possible to predict the level of effort and the extent of homeowner cooperation in each jurisdiction, nor the availability of markets for recycled

glass, tin cans and aluminum, the selection of a single, average, island-wide success rate for each projection date is appropriate.

- . The difficulties encountered in the establishment of any program involving changes in old habits and life styles suggests that only a moderately successful (25% of potential quantity) recycling program will be in place by 1990; a good program (37.5% of potential quantity), by 1995; and an excellent program (50%), by 2000 and thereafter.
- . There is a direct relationship between the quantity of ash produced by waste-to-energy facilities and the amount of ferrous metal available for post burn recovery and recycling. Inasmuch as ferrous metal constitutes an average of 15 to 20 percent of the total residue and inasmuch as the mechanized nature of the post burn ferrous recovery process assures an extremely high success rate, use of a residue based rate of 300 lbs. of ferrous per ton of ash is regarded as both conservative and reasonable.

A series of high and low projections of the quantities of residue requiring use or disposal, by municipality and five year period from 1990 through 2010, are presented in Table 11. Table 12 contains the estimated per capita savings and potential reduction in MSW with recycling by municipality for the years 1990-2010.

Calculations based on the pre-burn recycling success scenario postulated above suggest that Nassau municipalities could achieve

Table 11
Nassau and Suffolk Municipalities: Projected quantities of Ash Requiring Use or Disposal,
1990, 1995, 2000, 2005, 2010

Municipality	1990				1995				2000			
	TPD		TPY		TPD		TPY		TPD		TPY	
Glen Cove	41.1	49.6	15,002	18,104	40.4 - 48.9	14,746 - 17,849	39.6	48.1	14,454 - 17,557			
Hempstead	356.4	435.3	130,086	158,885	337.3 - 416.2	123,115 - 151,913	319.0	397.9	116,435 - 145,234			
Long Beach	32.0	38.8	11,680	14,162	31.0 - 37.8	11,315 - 13,797	30.0	36.8	10,950 - 13,432			
North Hempstead	-	-	-	-	151.3 - 185.0	55,225 - 67,525	145.4	179.1	53,071 - 65,372			
Oyster Bay	-	-	-	-	146.0 - 180.0	53,290 - 65,700	137.9	171.9	50,334 - 62,744			
Nassau County	429.5	523.7	156,768	191,151	706.0 - 867.9	257,690 - 316,784	671.9	833.8	245,244 - 304,337			
Babylon	116.5	142.0	42,523	51,830	110.8 - 136.3	40,442 - 49,750	104.8	130.3	38,252 - 47,560			
Brookhaven-Eastern Towns	-	-	-	-	-	-	236.7	296.2	86,396 - 108,113			
Huntington-Smithtown	-	-	-	-	144.0 - 178.0	52,560 - 64,970	135.1	169.1	49,312 - 61,722			
Islip	80.0	97.6	29,200	35,624	75.6 - 93.2	27,594 - 34,018	140.0	174.6	51,100 - 63,729			
Suffolk County	196.5	239.6	71,723	87,454	330.4 - 407.5	120,596 - 148,738	616.6	770.2	225,059 - 281,123			
The Bi-County Region	626.0	763.3	228,490	278,605	1,036.4 - 1,275.4	378,286 - 465,521	1,288.5	1,604.0	470,303 - 585,460			

Municipality	2005				2010			
	TPD		TPD		TPD		TPD	
Glen Cove	39.6	48.1	14,454	17,557	39.7 - 48.2	14,491 - 17,593		
Hempstead	319.4	398.3	116,581	145,380	319.9 - 398.8	116,764 - 145,562		
Long Beach	30.1	36.9	10,987	13,469	30.2 - 37.0	11,023 - 13,505		
North Hempstead	145.7	179.4	53,181	65,481	146.1 - 179.8	53,327 - 65,627		
Oyster Bay	138.3	172.3	50,480	62,890	138.9 - 172.9	50,699 - 63,109		
Nassau County	673.1	835.0	245,882	304,775	674.8 - 836.7	246,302 - 305,396		
Babylon	104.4	129.9	38,106	47,414	104.3 - 129.8	38,070 - 47,377		
Brookhaven-Eastern Towns	233.3	292.8	85,155	106,872	230.2 - 289.7	84,023 - 105,741		
Huntington-Smithtown	134.8	168.8	49,202	61,612	134.6 - 168.6	49,129 - 61,539		
Islip	139.7	174.3	50,991	63,620	139.5 - 174.1	50,918 - 63,547		
Suffolk County	612.2	765.8	223,453	279,517	608.6 - 762.2	222,139 - 278,203		
The Bi-County Region	1,285.3	1,600.8	469,135	584,292	1,283.4 - 1,598.9	468,441 - 583,599		

(a) The sums of the columns may not equal the printed totals due to rounding.

Source: LIRPB

Table 12
Nassau and Suffolk Municipalities:
Estimated Per Capita Savings and Potential Reduction in MSW With Recycling

		Recyclable	Max. Daily Per Capita Savings (lbs.)	Anticipated Per Capita Savings (lbs.)	Average Reductions (tpd) With Recycling				
					1990 Projection	1995 Projection	2000 Projection	2005 Projection	2010 Projection
Glen Cove City	excellent program 50% recycling	Glass	0.30	0.15	2.0	2.1	2.1	2.1	2.0
		Tin cans	0.10	0.05	0.7	0.7	0.7	0.7	0.7
		Aluminum	0.01	0.005	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.205	2.8	2.8	2.9	2.9	2.8
	good program 37.5% recycling	Glass	0.30	0.1125	1.5	1.5	1.6	1.6	1.5
		Tin cans	0.10	0.0375	0.5	0.5	0.5	0.5	0.5
		Aluminum	0.01	0.00375	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.15375	2.1	2.1	2.2	2.2	2.1
	moderately successful program 25% recycling	Glass	0.30	0.075	1.0	1.0	1.1	1.1	1.0
		Tin cans	0.10	0.025	0.3	0.3	0.4	0.4	0.3
		Aluminum	0.01	0.0025	0.0	0.0	0.0	0.0	0.0
		Total	0.41	0.1025	1.4	1.4	1.4	1.4	1.4
Hempstead Town	excellent program 50% recycling	Glass	0.30	0.15	55.3	55.5	55.0	54.8	54.4
		Tin cans	0.10	0.05	18.4	18.5	18.3	18.3	18.1
		Aluminum	0.01	0.005	1.8	1.8	1.8	1.8	1.8
		Total	0.41	0.205	75.6	75.8	75.2	74.8	74.3
	good program 37.5% recycling	Glass	0.30	0.1125	41.5	41.6	41.3	41.1	40.8
		Tin cans	0.10	0.0375	13.8	13.9	13.8	13.7	13.6
		Aluminum	0.01	0.00375	1.4	1.4	1.4	1.4	1.4
		Total	0.41	0.15375	56.7	56.9	56.4	56.1	55.7
	moderately successful program 25% recycling	Glass	0.30	0.075	27.7	27.7	27.5	27.4	27.2
		Tin cans	0.10	0.025	9.2	9.2	9.2	9.1	9.1
		Aluminum	0.01	0.0025	0.9	0.9	0.9	0.9	0.9
		Total	0.41	0.1025	37.8	37.9	37.6	37.4	37.2
Long Beach City	excellent program 50% recycling	Glass	0.30	0.15	2.9	2.9	2.9	2.9	2.8
		Tin cans	0.10	0.05	1.0	1.0	1.0	1.0	0.9
		Aluminum	0.01	0.005	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.205	4.0	4.0	4.0	3.9	3.8
	good program 37.5% recycling	Glass	0.30	0.1125	2.2	2.2	2.2	2.1	2.1
		Tin cans	0.10	0.0375	0.7	0.7	0.7	0.7	0.7
		Aluminum	0.01	0.00375	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.15375	3.0	3.0	3.0	2.9	2.9
	moderately successful program 25% recycling	Glass	0.30	0.075	1.5	1.5	1.4	1.4	1.4
		Tin cans	0.10	0.025	0.5	0.5	0.5	0.5	0.5
		Aluminum	0.01	0.0025	0.0	0.0	0.0	0.0	0.0
		Total	0.41	0.1025	2.0	2.0	2.0	2.0	1.9
North Hempstead Town	excellent program 50% recycling	Glass	0.30	0.15	16.5	16.6	16.7	16.5	16.2
		Tin cans	0.10	0.05	5.5	5.5	5.6	5.5	5.4
		Aluminum	0.01	0.005	0.6	0.6	0.6	0.6	0.5
		Total	0.41	0.205	22.6	22.7	22.9	22.6	22.2

Table 12
Nassau and Suffolk Municipalities:
Estimated Per Capita Savings and Potential Reduction in MSW With Recycling

	Recyclable	Max. Daily Per Capita Savings (lbs.)	Anticipated Per Capita Savings (lbs.)	Average Reductions (tpd) With Recycling					
				1990 Projection	1995 Projection	2000 Projection	2005 Projection	2010 Projection	
Oyster Bay Town	good program 37.5% recycling	Glass	0.30	0.1125	12.4	12.4	12.5	12.4	12.2
		Tin cans	0.10	0.0375	4.1	4.1	4.2	4.1	4.1
		Aluminum	0.01	0.00375	0.4	0.4	0.4	0.4	0.4
		Total	0.41	0.15375	16.9	17.0	17.1	16.9	16.6
	moderately successful program 25% recycling	Glass	0.30	0.075	8.3	8.3	8.4	8.3	8.1
		Tin cans	0.10	0.025	2.8	2.8	2.8	2.8	2.7
		Aluminum	0.01	0.0025	0.3	0.3	0.3	0.3	0.3
		Total	0.41	0.1025	11.3	11.3	11.4	11.3	11.1
	excellent program 50% recycling	Glass	0.30	0.15	23.3	23.4	23.5	23.2	22.7
		Tin cans	0.10	0.05	7.8	7.8	7.8	7.7	7.6
	Aluminum	0.01	0.005	0.8	0.8	0.8	0.8	0.8	
	Total	0.41	0.205	31.8	32.0	32.1	31.7	31.1	
Nassau County	good program 37.5% recycling	Glass	0.30	0.1125	17.4	17.6	17.6	17.4	17.1
		Tin cans	0.10	0.0375	5.8	5.9	5.9	5.8	5.7
		Aluminum	0.01	0.00375	0.6	0.6	0.6	0.6	0.6
		Total	0.41	0.15375	23.8	24.0	24.1	23.7	23.3
	moderately successful program 25% recycling	Glass	0.30	0.075	11.6	11.7	11.7	11.6	11.4
		Tin cans	0.10	0.025	3.9	3.9	3.9	3.9	3.8
		Aluminum	0.01	0.0025	0.4	0.4	0.4	0.4	0.4
		Total	0.41	0.1025	15.9	16.0	16.0	15.8	15.5
	excellent program 50% recycling	Glass	0.30	0.15	100.0	100.4	100.2	99.4	98.2
		Tin cans	0.10	0.05	33.3	33.5	33.4	33.1	32.7
	Aluminum	0.01	0.005	3.3	3.3	3.3	3.3	3.3	
	Total	0.41	0.205	136.7	137.3	137.0	135.8	134.2	
Babylon Town	good program 37.5% recycling	Glass	0.30	0.1125	75.0	75.3	75.2	74.5	73.6
		Tin cans	0.10	0.0375	25.0	25.1	25.1	24.8	24.5
		Aluminum	0.01	0.00375	2.5	2.5	2.5	2.5	2.5
		Total	0.41	0.15375	102.5	102.9	102.7	101.9	100.6
	moderately successful program 25% recycling	Glass	0.30	0.075	50.0	50.2	50.1	49.7	49.1
		Tin cans	0.10	0.025	16.7	16.7	16.7	16.6	16.4
		Aluminum	0.01	0.0025	1.7	1.7	1.7	1.7	1.6
		Total	0.41	0.1025	68.3	68.6	68.5	67.9	67.1
	excellent program 50% recycling	Glass	0.30	0.15	16.1	16.3	16.6	16.9	16.9
		Tin cans	0.10	0.05	5.4	5.4	5.5	5.6	5.6
	Aluminum	0.01	0.005	0.5	0.5	0.6	0.6	0.6	
	Total	0.41	0.205	22.0	22.2	22.7	23.1	23.2	
good program 37.5% recycling	Glass	0.30	0.1125	12.1	12.2	12.5	12.7	12.7	
	Tin cans	0.10	0.0375	4.0	4.1	4.2	4.2	4.2	
	Aluminum	0.01	0.00375	0.4	0.4	0.4	0.4	0.4	
	Total	0.41	0.15375	16.5	16.7	17.1	17.3	17.4	

Table 12
Nassau and Suffolk Municipalities:
Estimated Per Capita Savings and Potential Reduction in MSW With Recycling

	Recyclable	Max. Daily Per Capita Savings (lbs.)	Anticipated Per Capita Savings (lbs.)	Average Reductions (tpd) With Recycling					
				1990 Projection	1995 Projection	2000 Projection	2005 Projection	2010 Projection	
Brookhaven Town	moderately successful program 25% recycling	Glass	0.30	0.075	8.1	8.1	8.3	8.4	8.5
		Tin cans	0.10	0.025	2.7	2.7	2.8	2.8	2.8
		Aluminum	0.01	0.0025	0.3	0.3	0.3	0.3	0.3
		Total	0.41	0.1025	11.0	11.1	11.4	11.5	11.6
	excellent program 50% recycling	Glass	0.30	0.15	31.9	34.9	37.9	40.1	41.9
		Tin cans	0.10	0.05	10.8	11.6	12.6	13.4	14.0
		Aluminum	0.01	0.005	1.1	1.2	1.3	1.3	1.4
		Total	0.41	0.205	43.6	47.7	51.8	54.7	57.3
	good program 37.5% recycling	Glass	0.30	0.1125	23.9	26.2	28.5	30.0	31.4
		Tin cans	0.10	0.0375	8.0	8.7	9.5	10.0	10.5
		Aluminum	0.01	0.00375	0.8	0.9	0.9	1.0	1.0
		Total	0.41	0.15375	32.7	35.8	38.9	41.1	43.0
Huntington Town	moderately successful program 25% recycling	Glass	0.30	0.075	15.9	17.5	19.0	20.0	21.0
		Tin cans	0.10	0.025	5.3	5.8	6.3	6.7	7.0
		Aluminum	0.01	0.0025	0.5	0.6	0.6	0.7	0.7
		Total	0.41	0.1025	21.8	23.9	25.9	27.4	28.6
	excellent program 50% recycling	Glass	0.30	0.15	15.8	16.0	16.0	16.1	16.1
		Tin cans	0.10	0.05	5.3	5.3	5.3	5.4	5.4
		Aluminum	0.01	0.005	0.5	0.5	0.5	0.5	0.5
		Total	0.41	0.205	21.5	21.9	21.9	22.0	22.0
	good program 37.5% recycling	Glass	0.30	0.1125	11.8	12.0	12.0	12.1	12.1
		Tin cans	0.10	0.0375	3.9	4.0	4.0	4.0	4.0
		Aluminum	0.01	0.00375	0.4	0.4	0.4	0.4	0.4
		Total	0.41	0.15375	16.1	16.4	16.4	16.5	16.5
Islip Town	moderately successful program 25% recycling	Glass	0.30	0.075	7.9	8.0	8.0	8.1	8.1
		Tin cans	0.10	0.025	2.6	2.7	2.7	2.7	2.7
		Aluminum	0.01	0.0025	0.3	0.3	0.3	0.3	0.3
		Total	0.41	0.1025	10.8	11.0	11.0	11.0	11.0
	excellent program 50% recycling	Glass	0.30	0.15	23.3	24.0	24.2	24.4	24.6
		Tin cans	0.10	0.05	7.8	8.0	8.1	8.1	8.2
		Aluminum	0.01	0.005	0.8	0.8	0.8	0.8	0.8
		Total	0.41	0.205	31.9	32.7	33.1	33.4	33.6
	good program 37.5% recycling	Glass	0.30	0.1125	17.5	18.0	18.1	18.3	18.4
		Tin cans	0.10	0.0375	5.8	6.0	6.0	6.1	6.1
		Aluminum	0.01	0.00375	0.6	0.6	0.6	0.6	0.6
		Total	0.41	0.15375	23.9	24.6	24.8	25.0	25.2
moderately successful program 25% recycling	Glass	0.30	0.075	11.7	12.0	12.1	12.2	12.3	
	Tin cans	0.10	0.025	3.9	4.0	4.0	4.1	4.1	
	Aluminum	0.01	0.0025	0.4	0.4	0.4	0.4	0.4	
	Total	0.41	0.1025	15.9	16.4	16.5	16.7	16.8	

Table 12
Nassau and Suffolk Municipalities:
Estimated Per Capita Savings and Potential Reduction in MSW With Recycling

		Recyclable	Max. Daily Per Capita Savings (lbs.)	Anticipated Per Capita Savings (lbs.)	Average Reductions (tpd) With Recycling				
					1990 Projection	1995 Projection	2000 Projection	2005 Projection	2010 Projection
Riverhead Town	excellent program 50% recycling	Glass	0.30	0.15	1.8	2.1	2.5	2.6	2.8
		Tin cans	0.10	0.05	0.6	0.7	0.8	0.9	0.9
		Aluminum	0.01	0.005	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.205	2.4	2.9	3.4	3.6	3.8
	good program 37.5% recycling	Glass	0.30	0.1125	1.3	1.6	1.9	2.0	2.1
		Tin cans	0.10	0.0375	0.4	0.5	0.6	0.7	0.7
		Aluminum	0.01	0.00375	0.0	0.1	0.1	0.1	0.1
		Total	0.41	0.15375	1.8	2.2	2.6	2.7	2.9
	moderately successful program 25% recycling	Glass	0.30	0.075	0.9	1.1	1.2	1.3	1.4
		Tin cans	0.10	0.025	0.3	0.4	0.4	0.4	0.5
		Aluminum	0.01	0.0025	0.0	0.0	0.0	0.0	0.0
		Total	0.41	0.1025	1.2	1.5	1.7	1.8	1.9
Smithtown Town	excellent program 50% recycling	Glass	0.30	0.15	9.3	9.4	9.5	9.7	9.8
		Tin cans	0.10	0.05	3.1	3.1	3.2	3.2	3.3
		Aluminum	0.01	0.005	0.3	0.3	0.3	0.3	0.3
		Total	0.41	0.205	12.8	12.9	13.0	13.2	13.4
	good program 37.5% recycling	Glass	0.30	0.1125	7.0	7.1	7.1	7.3	7.4
		Tin cans	0.10	0.0375	2.3	2.4	2.4	2.4	2.5
		Aluminum	0.01	0.00375	0.2	0.2	0.2	0.2	0.2
		Total	0.41	0.15375	9.6	9.6	9.8	9.9	10.1
	moderately successful program 25% recycling	Glass	0.30	0.075	4.7	4.7	4.8	4.8	4.9
		Tin cans	0.10	0.025	1.6	1.6	1.6	1.6	1.6
		Aluminum	0.01	0.0025	0.2	0.2	0.2	0.2	0.2
		Total	0.41	0.1025	6.4	6.4	6.5	6.6	6.7
Southampton Town	excellent program 50% recycling	Glass	0.30	0.15	3.9	4.0	4.1	4.3	4.6
		Tin cans	0.10	0.05	1.3	1.3	1.4	1.4	1.5
		Aluminum	0.01	0.005	0.1	0.1	0.1	0.1	0.2
		Total	0.41	0.205	5.3	5.5	5.6	5.9	6.2
	good program 37.5% recycling	Glass	0.30	0.1125	2.9	3.0	3.1	3.2	3.4
		Tin cans	0.10	0.0375	1.0	1.0	1.0	1.1	1.1
		Aluminum	0.01	0.00375	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.15375	4.0	4.1	4.2	4.4	4.7
	moderately successful program 25% recycling	Glass	0.30	0.075	2.0	2.0	2.1	2.2	2.3
		Tin cans	0.10	0.025	0.7	0.7	0.7	0.7	0.8
		Aluminum	0.01	0.0025	0.1	0.1	0.1	0.1	0.1
		Total	0.41	0.1025	2.7	2.7	2.8	3.0	3.1
Suffolk County	excellent program 50% recycling	Glass	0.30	0.15	105.2	110.1	114.6	118.1	121.1
		Tin cans	0.10	0.05	35.1	36.7	38.2	39.4	40.4
		Aluminum	0.01	0.005	3.5	3.7	3.8	3.9	4.0
		Total	0.41	0.205	143.8	150.5	156.6	161.4	165.5

Table 12
Nassau and Suffolk Municipalities:
Estimated Per Capita Savings and Potential Reduction in MSW With Recycling

	Recyclable	Max. Daily Per Capita Savings (lbs.)	Anticipated Per Capita Savings (lbs.)	Average Reductions (tpd) With Recycling				
				1990 Projection	1995 Projection	2000 Projection	2005 Projection	2010 Projection
good program 37.5% recycling	Glass	0.30	0.1125	78.9	82.6	85.9	88.6	90.8
	Tin cans	0.10	0.0375	26.3	27.5	28.6	29.5	30.3
	Aluminum	0.01	0.00375	2.6	2.8	2.9	3.0	3.0
	Total	0.41	0.15375	107.9	112.9	117.4	121.0	124.1
moderately successful program 25% recycling	Glass	0.30	0.075	52.6	55.1	57.3	59.0	60.5
	Tin cans	0.10	0.025	17.5	18.4	19.1	19.7	20.2
	Aluminum	0.01	0.0025	1.8	1.8	1.9	2.0	2.0
	Total	0.41	0.1025	71.9	75.2	78.3	80.7	82.8
The Bi-County Region excellent program 50% recycling	Glass	0.30	0.15	205.2	210.5	214.8	217.4	219.3
	Tin cans	0.10	0.05	68.4	70.2	71.6	72.5	73.1
	Aluminum	0.01	0.005	6.8	7.0	7.2	7.2	7.3
	Total	0.41	0.205	280.5	287.7	293.5	297.2	299.7
good program 37.5% recycling	Glass	0.30	0.1125	153.9	157.9	161.1	163.1	164.4
	Tin cans	0.10	0.0375	51.3	52.6	53.7	54.4	54.8
	Aluminum	0.01	0.00375	5.1	5.3	5.4	5.4	5.5
	Total	0.41	0.15375	210.4	215.8	220.2	222.9	224.7
moderately successful program 25% recycling	Glass	0.30	0.075	102.6	105.3	107.4	108.7	109.6
	Tin cans	0.10	0.025	34.2	35.1	35.8	36.2	36.5
	Aluminum	0.01	0.0025	3.4	3.5	3.6	3.6	3.7
	Total	0.41	0.1025	140.2	143.9	146.8	148.6	149.8

Source: New York State Department of Commerce
LILCO
LIRPB, Sept. 4, 1987
February 7, 1990

reductions in ash quantities ranging from a low of approximately 41 tpd in 1990 to a high of 137 tpd in the year 2000 when all anticipated facilities are on line and the county population reaches the high point for the projection period. Suffolk municipalities could achieve reductions ranging from approximately 19 tpd in 1990 to 160 tpd in the year 2010 when all anticipated facilities are on line and population is at its peak for the projection period.

Calculations based on the last of the assumptions relating to recycling indicate that bi-county municipalities could also achieve significant reductions through post burn recycling of other ferrous metal. Nassau's three towns and two cities could effect additional "savings" ranging from of as little as 83 tpd in 1990 to as much as 171 tpd in the year 2000 and the years thereafter. Suffolk's towns could achieve "savings ranging from 38 tpd in 1990 to 163 tpd in the year 2000 and the years thereafter.

Imbalance Between Ash Generation and Disposal Capacity

The closing of most Long Island landfills limits the ability of Long Island municipalities to manage their ash in local landfills. Table 13 presents a listing of the assumptions concerning available management opportunities. the comparison of anticipated ash generating and local disposal as presented in Table 14 and Figure 2, provides an indication of the magnitude of the estimated imbalance between the quantities of residue requiring disposal and potential ashfill space in the bi-county area.

Calculations of ash quantities and disposal capacity are based

on two sets of projections and, therefore, reflect assumptions as to the existence and operation of local waste-to-energy facilities and as to the ash management options likely to be available to various municipalities. The first of assumptions and the resulting calculations may be found in Table 11, the second, in Tables 13 and 14 respectively.

TABLE 13

Listing of Assumptions Relative
to Ash Management Options
for Each Long Island Municipality
Over Next 10 Years (1)

Municipality	1990	1995	2000
Nassau County			
Glen Cove	Ash Export	Ash Export	Ash Export
Hempstead	Ash Export	50% Ash Export	50% Ash Export
Long Beach	Ash Export	Ash Export	Ash Export
North Hempstead	None	Local Landfill	Local Landfill
Oyster Bay	None	Ash Export	Ash Export
Suffolk County			
Babylon	Local Landfill	Local Landfill	Ash Export
Brookhaven	None	Local Landfill	Local Landfill
Huntington	Local Landfill	Local Landfill	Local Landfill
Islip	Local Landfill	Ash Export	Ash Export

1. Ash Export = all ash transported off Long Island.

Local Landfill = all ash disposal in local landfill on Long Island.

50% Ash Export = 50% of ash exported off Long Island, and 50% disposed of in local landfill.

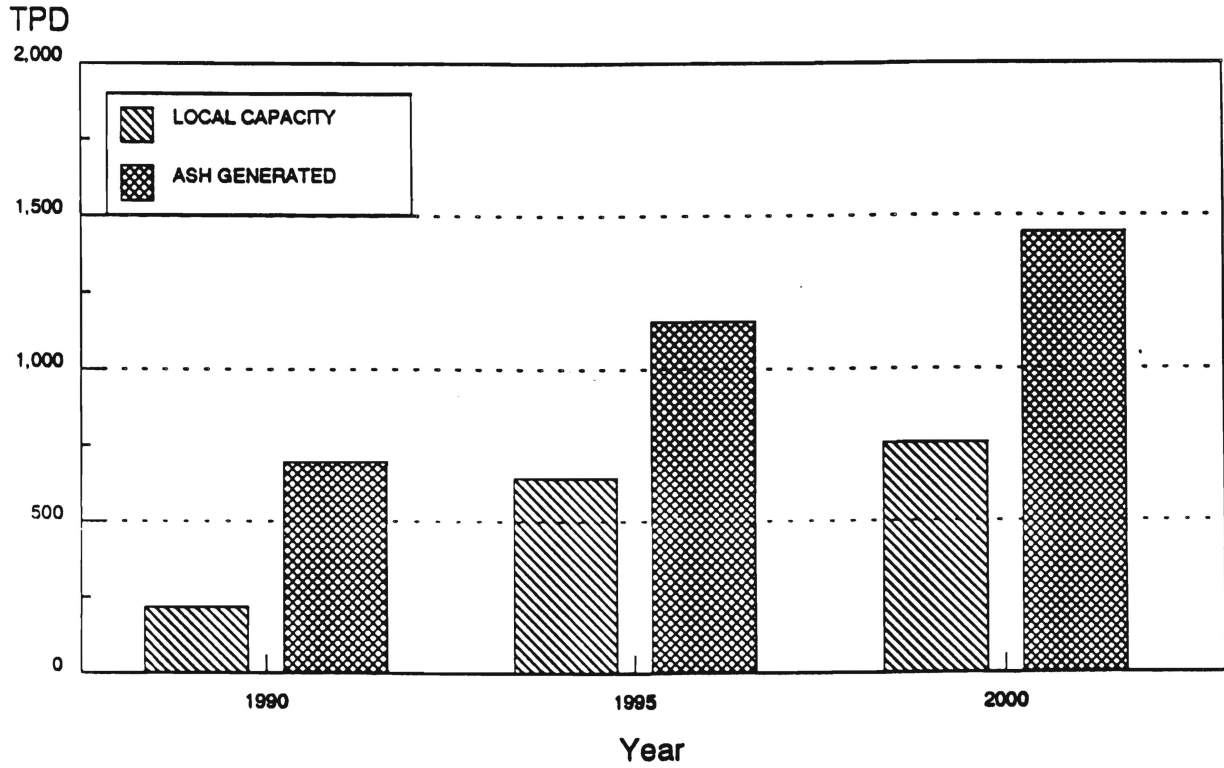
None = no ash generated at designated time.

TABLE 14

Ash Management/Quantity Projections
1990, 1995, 2000

Year	Municipality	Ash Generation Rate (tpd)	Management Strategy		
			Local Landfill	Ash Export	
1990	Nassau County				
	Glen Cove	45	--	45	
	Hempstead	396	--	396	
	Long Beach	35	--	35	
	Suffolk County				
	Babylon	129	129	--	
	Islip	89	89	--	
	Totals	694	218	476	
	1995	Nassau County			
		Glen Cove	45	--	45
Hempstead		377	188	188	
Long Beach		34	--	34	
North Hempstead		168	168	--	
Oyster Bay		163	--	163	
Suffolk County					
Babylon		124	124	--	
Huntington		161	161	--	
Islip		84	--	84	
Totals	1156	641	514		
2000	Nassau County				
	Glen Cove	44	--	44	
	Hempstead	358	179	179	
	Long Beach	33	--	33	
	North Hempstead	162	162	--	
	Oyster Bay	155	--	155	
	Suffolk County				
	Babylon	118	--	118	
	Brookhaven	266	266	--	
	Huntington	152	152	--	
Islip	157	--	157		
Totals	1445	759	686		

Figure 2
LONG ISLAND ASH MANAGEMENT CAPACITY



1990 : 218 TPD CAPACITY / 685 TPD GENERATION
1995 : 641 TPD CAPACITY / 1156 TPD GENERATION
2000 : 760 TPD CAPACITY / 1448 TPD GENERATION

The results indicate that over the next decade there will be a significant shortfall in the Island's ability to manage its ash stream locally. Over the next five years and estimated 500 or more tons per day will have to be shipped to out of area disposal sites. By the year 2000, ash exports can be expected to reach approximately 700 tpd.

Conclusions

If the Long Island Regional Planning Board assumptions are correct, a combination of pre- and post burn recycling efforts could make a considerable difference in the amount of residue requiring use or disposal. In fact, the combination could decrease the projected regional totals by from 21 to 23 percent in 1990; 24 to 26 percent in 1995; 28 to 31 percent in 2000; and from 28 to between 31 and 33 percent thereafter. Table 13 projects the generation and reduction estimates with pre and post burn recycling.

Even with the projected pre-burn recycling and post burn ferrous removals anticipated for the year 2000 and thereafter, Long Island municipalities will still have to deal with enormous quantities of ash each day. Stated in somewhat more comprehensible terms, the reduced quantities of ash would still require a daily average of between 1200 to 1600 cubic yards of landfill or ashfill space for burial or between 35 and 46 thirty-five ton capacity trucks to ship it off Long Island, should other disposal sites be available.

Table 15
Nassau and Suffolk Municipalities: Projected Average Ash Generation and Reductions With Recycling

Municipality	1990						1995						2000					
	Potential Reduction With Recycling (a)						Potential Reduction With Recycling (b)						Potential Reduction With Recycling (c)					
	Ash (TPD) Without Recycling	Pre-burn Quantity (TPD)	Post-burn Quantity (TPD)	Quantity Requiring Use or Disposal		Ash (TPD) Without Recycling	Pre-burn Quantity (TPD)	Post-burn Quantity (TPD)	Quantity Requiring Use or Disposal		Ash (TPD) Without Recycling	Pre-burn Quantity (TPD)	Post-burn Quantity (TPD)	Quantity Requiring Use or Disposal				
Glen Cove	50.0 - 60.0	1.4	7.5 - 9.0	41.1 - 49.6	50.0 - 60.0	2.1	7.5 - 9.0	40.4 - 48.9	50.0 - 60.0	2.9	7.5 - 9.0	39.6 - 48.1	50.0 - 60.0	2.9	7.5 - 9.0	39.6 - 48.1		
Hempstead	463.8 - 556.6	37.6	69.6 - 83.5	356.4 - 435.3	463.8 - 556.6	58.9	69.6 - 83.5	337.3 - 416.2	463.8 - 556.6	75.2	69.6 - 83.5	319.0 - 397.9	463.8 - 556.6	75.2	69.6 - 83.5	319.0 - 397.9		
Long Beach	40.0 - 48.0	2.0	6.0 - 7.2	32.0 - 36.8	40.0 - 48.0	3.0	6.0 - 7.2	31.0 - 37.8	40.0 - 48.0	4.0	6.0 - 7.2	30.0 - 36.8	40.0 - 48.0	4.0	6.0 - 7.2	30.0 - 36.8		
North Hempstead	- - -	-	- - -	- - -	198.0 - 237.6	17.0	29.7 - 35.6	151.3 - 185.0	198.0 - 237.6	22.9	29.7 - 35.6	145.4 - 179.1	198.0 - 237.6	22.9	29.7 - 35.6	145.4 - 179.1		
Oyster Bay	- - -	-	- - -	- - -	200.0 - 240.0	24.0	30.0 - 36.0	146.0 - 180.0	200.0 - 240.0	32.1	30.0 - 36.0	137.9 - 171.9	200.0 - 240.0	32.1	30.0 - 36.0	137.9 - 171.9		
Nassau County	553.8 - 664.6	41.2	83.1 - 99.7	429.5 - 523.7	951.8 - 1,142.2	102.9	142.8 - 171.3	708.1 - 868.0	951.8 - 1,142.2	137.1	142.8 - 171.3	671.9 - 833.8	951.8 - 1,142.2	137.1	142.8 - 171.3	671.9 - 833.8		
Babylon	150.0 - 180.0	11.0	22.5 - 27.0	116.5 - 142.0	150.0 - 180.0	16.7	22.5 - 27.0	110.8 - 136.3	150.0 - 180.0	22.7	22.5 - 27.0	104.8 - 130.3	150.0 - 180.0	22.7	22.5 - 27.0	104.8 - 130.3		
Brookhaven-Eastern Towns	- - -	-	- - -	- - -	- - -	-	- - -	- - -	350.0 - 420.0	60.8	52.5 - 63.0	236.7 - 296.2	350.0 - 420.0	60.8	52.5 - 63.0	236.7 - 296.2		
Huntington-Smithtown	- - -	-	- - -	- - -	200.0 - 240.0	26.0	30.0 - 36.0	144.0 - 178.0	200.0 - 240.0	34.9	30.0 - 36.0	135.1 - 169.1	200.0 - 240.0	34.9	30.0 - 36.0	135.1 - 169.1		
Islip	103.6 - 124.3	8.1	15.5 - 18.6	80.0 - 97.6	103.6 - 124.3	12.5	15.5 - 18.6	75.6 - 93.2	103.6 - 124.3	33.1	30.5 - 36.6	140.0 - 174.6	103.6 - 124.3	33.1	30.5 - 36.6	140.0 - 174.6		
Suffolk County	253.6 - 304.3	19.1	36.0 - 45.6	196.5 - 239.6	453.6 - 544.3	55.2	68.0 - 81.6	330.4 - 407.5	453.6 - 544.3	55.2	68.0 - 81.6	330.4 - 407.5	453.6 - 544.3	55.2	68.0 - 81.6	330.4 - 407.5		
The BI-County Region	807.4 - 968.9	60.3	121.1 - 145.3	626.0 - 763.3	1,405.4 - 1,686.5	158.1	210.8 - 252.9	1,036.5 - 1,275.5	1,405.4 - 1,686.5	288.6	276.3 - 333.9	1,288.5 - 1,604.0	1,405.4 - 1,686.5	288.6	276.3 - 333.9	1,288.5 - 1,604.0		
Municipality	2005						2010						2000					
	Potential Reduction With Recycling (a)						Potential Reduction With Recycling (b)						Potential Reduction With Recycling (c)					
	Ash (TPD) Without Recycling	Pre-burn Quantity (TPD)	Post-burn Quantity (TPD)	Quantity Requiring Use or Disposal		Ash (TPD) Without Recycling	Pre-burn Quantity (TPD)	Post-burn Quantity (TPD)	Quantity Requiring Use or Disposal		Ash (TPD) Without Recycling	Pre-burn Quantity (TPD)	Post-burn Quantity (TPD)	Quantity Requiring Use or Disposal				
Glen Cove	50.0 - 60.0	2.9	7.5 - 9.0	39.6 - 48.1	50.0 - 60.0	2.8	7.5 - 9.0	39.7 - 48.2	50.0 - 60.0	2.9	7.5 - 9.0	39.6 - 48.1	50.0 - 60.0	2.9	7.5 - 9.0	39.6 - 48.1		
Hempstead	463.8 - 556.6	74.8	69.6 - 83.5	319.4 - 398.3	463.8 - 556.6	74.3	69.6 - 83.5	319.9 - 398.8	463.8 - 556.6	74.3	69.6 - 83.5	319.9 - 398.8	463.8 - 556.6	74.3	69.6 - 83.5	319.9 - 398.8		
Long Beach	40.0 - 48.0	3.9	6.0 - 7.2	30.1 - 36.9	40.0 - 48.0	3.8	6.0 - 7.2	30.2 - 37.0	40.0 - 48.0	3.8	6.0 - 7.2	30.2 - 37.0	40.0 - 48.0	3.8	6.0 - 7.2	30.2 - 37.0		
North Hempstead	198.0 - 237.6	22.6	29.7 - 35.6	145.7 - 179.4	198.0 - 237.6	22.2	29.7 - 35.6	146.1 - 179.8	198.0 - 237.6	22.2	29.7 - 35.6	146.1 - 179.8	198.0 - 237.6	22.2	29.7 - 35.6	146.1 - 179.8		
Oyster Bay	200.0 - 240.0	31.7	30.0 - 36.0	138.3 - 172.3	200.0 - 240.0	31.1	30.0 - 36.0	138.9 - 172.9	200.0 - 240.0	31.1	30.0 - 36.0	138.9 - 172.9	200.0 - 240.0	31.1	30.0 - 36.0	138.9 - 172.9		
Nassau County	951.8 - 1,142.2	135.9	142.8 - 171.3	673.1 - 835.0	951.8 - 1,142.2	134.2	142.8 - 171.3	674.8 - 836.7	951.8 - 1,142.2	134.2	142.8 - 171.3	674.8 - 836.7	951.8 - 1,142.2	134.2	142.8 - 171.3	674.8 - 836.7		
Babylon	150.0 - 180.0	23.1	22.5 - 27.0	104.4 - 129.9	150.0 - 180.0	23.2	22.5 - 27.0	104.3 - 129.8	150.0 - 180.0	23.2	22.5 - 27.0	104.3 - 129.8	150.0 - 180.0	23.2	22.5 - 27.0	104.3 - 129.8		
Brookhaven-Eastern Towns	350.0 - 420.0	64.2	52.5 - 63.0	233.3 - 292.8	350.0 - 420.0	67.3	52.5 - 63.0	230.2 - 289.7	350.0 - 420.0	67.3	52.5 - 63.0	230.2 - 289.7	350.0 - 420.0	67.3	52.5 - 63.0	230.2 - 289.7		
Huntington-Smithtown	200.0 - 240.0	35.2	30.0 - 36.0	134.8 - 168.8	200.0 - 240.0	35.4	30.0 - 36.0	134.6 - 168.6	200.0 - 240.0	35.4	30.0 - 36.0	134.6 - 168.6	200.0 - 240.0	35.4	30.0 - 36.0	134.6 - 168.6		
Islip	203.6 - 244.3	33.4	30.5 - 36.6	139.7 - 174.3	203.6 - 244.3	33.6	30.5 - 36.6	139.5 - 174.1	203.6 - 244.3	33.6	30.5 - 36.6	139.5 - 174.1	203.6 - 244.3	33.6	30.5 - 36.6	139.5 - 174.1		
Suffolk County	903.6 - 1,084.3	155.9	135.5 - 162.6	612.2 - 765.6	903.6 - 1,084.3	159.5	135.5 - 162.6	608.6 - 762.2	903.6 - 1,084.3	159.5	135.5 - 162.6	608.6 - 762.2	903.6 - 1,084.3	159.5	135.5 - 162.6	608.6 - 762.2		
The BI-County Region	1,855.4 - 2,226.5	291.8	276.3 - 333.9	1,285.3 - 1,600.8	1,855.4 - 2,226.5	293.7	276.3 - 333.9	1,283.4 - 1,598.9	1,855.4 - 2,226.5	293.7	276.3 - 333.9	1,283.4 - 1,598.9	1,855.4 - 2,226.5	293.7	276.3 - 333.9	1,283.4 - 1,598.9		

(a) 25% success rate for pre-burn
 (b) 37.5% success rate for pre-burn
 (c) 50% success rate for pre-burn
 (d) Assumed ferrous recovery equal to 15% of ash stream.

Source: LRPB 2/15/90

ASH USE ECONOMICS

Long Island uses about 4,500,000 tons of aggregate per year as fill or in the production of bituminous and portland concrete. Another 10,000,000 tons can be used for current daily landfill cover and eventual final landfill cover and landfill stabilization. The construction of artificial reefs made from incinerator ash blocks could use 7,000,000 tons for the first 20 percent of the allowable reef space. Table 16 summarizes this data.

Table 16
Estimated Quantities of
Aggregate Use on Long Island

<u>Application</u>	<u>Quantity (1)</u>
Fill Material (2)	1,800,000 tpy
Bituminous Concrete (2)	1,420,000 tpy
Portland Cement Concrete (2)	1,360,000 tpy
Daily Landfill Cover (3)	650,000 tpy
Final Landfill Cover (3,4)	1,500,000 tons
Landfill Stabilization (5)	7,500,000 tons
Artificial Reef (6)	7,000,000 tons

- (1) Quantities reported in tons per year (tpy) or tons
- (2) Based on 1986 survey and estimated quantity
- (3) Based on 1987 survey of Long Island towns
- (4) Represents total available capacity that could be used in an impermeable 18-in. layer as per NYSDEC Part 360 regulations.
- (5) Represents estimate of total available landfill stabilization capacity.
- (6) Represents estimate of total available reef capacity using 20% of permitted reef space.

If all of the current and proposed incinerators are built on Long Island, almost 2,700,000 tons of MSW will be combusted annually shortly after the turn of the century. This will produce approximately 600,000 gross tons of combined ash yearly. If efficient post-burn ferrous recovery is made, the tonnage could drop to 480,000 tons Island-wide.

Assuming that bituminous and Portland concretes can use ash or treated ash products for up to 20 percent of the aggregates needed, that means 540,000 tons per year could be absorbed by that industry alone-an amount greater than would be generated by all the incinerators combined. Just the short-term needs for final landfill covering and landfill stabilization could use the ash output for almost twenty years. A similar example could be made for man-made ashblock reefs.

The key, of course, is acceptance by the State DEC of encapsulated ash for reuse in aggregate applications. It must be understood that all discussions of potential cost savings represent the difference between avoided disposal cost and the cost of implementing an ash reuse technology. In other words, the economics of ash reuse involves the comparison between the cost in preparing the ash for local reuse, and the cost if the untreated ash has to be exported. Table 17 lists the estimated costs to render ash reusable by the Towns or by the private sector.

Table 17

Ash Recycling Unit Cost Projections

Technology

Low Technology Applications

Daily Landfill Cover	\$20 to \$50 per ton
Road Base	\$20 to \$50 per ton
Miscellaneous Fill	\$20 to \$50 per ton

Medium Technology Applications

Bituminous Concrete	
Paving Material	\$20 to \$50 per ton
Portland Cement Concrete	\$20 to \$50 per ton
Stabilized Fill Material	\$20 to \$50 per ton
Artificial Reef Applications	\$75 to \$150 per ton
Erosion Control Applications	\$75 to \$150 per ton
Final Landfill cover	\$40 to \$80 per ton
Landfill Stabilization	\$75 to \$80 per ton

High Technology Applications

Ash Melting or Vitrification	\$100 to \$200 per ton
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Virtually all of the low and medium technology applications compare favorably in cost with the current disposal costs that exceed \$100 per ton. If the ash is reused for any or a combination of the first six applications where the cost ranges from \$20 to \$50 per ton, the Towns could save from 50% to 75% of what it would cost to export the ash.

Increasing costs of landfill design and construction and the current difficulty in finding suitable Long Island sites or off-Island sites willing to accept Long Island ash, and increasing pressures on mid-western states to restrict and/or eliminate future importation of solid waste or ash from the northeast can only result in ever increasing costs for off-Island shipment. Thus, the economics of scale become even more cost effective in favor of local usage and disposal. Tables 18 and 19 list the opportunities for ash cover and artificial reef disposals.

Institutional Issues

The processing and reuse of ash from incinerators represents a relatively new approach in municipal solid waste management in the United States. As is often the case with a new activity, neither the legal, regulatory and institutional structure, nor the public perception, have yet caught up with the rapidly evolving technology. The uncertainties created by the absence of an appropriate institutional framework and the concern for negative public response to reuse proposals may severely impair the implementation of ash reuse.

TABLE 18
Final Cover Quantity Estimates, 1987

<u>Town</u>	<u>Acres Requiring Cover</u>
North Hempstead	85
Oyster Bay	86
Hempstead	180
Babylon	60
Brookhaven	25
East Hampton	60
Huntington	52
Islip	50
Riverhead	36
Shelter Island	8
Southampton	92
Southold	<u>41</u>
<i>Total</i>	775

<u>Total Acres</u>	<u>Ash Cover (ft)</u>	<u>Cover Unit Wt (ton/cy)</u>	<u>Ash in Cover (%)</u>	<u>Total Capacity (tons)</u>
775	1.5	1	80	1,500,000

Source: Chesner Engineering, P.C. (Ref. no. 20)
Collins. R.J., et al (Ref. no. 21)

For a listing of the Long Island Regional Planning Boards' Ash Study, see Appendix A.

TABLE 19
Long Island Artificial Reef Sites and Capacity Estimates

<u>Name</u>	<u>Location</u>	<u>Dimensions</u>	<u>Status</u>	<u>Capacity(ft)³</u>		<u>Tons of Blocks¹</u>
				<u>Total</u>	<u>Remaining</u>	<u>35% Voids</u>
1. Rockaway Beach	5 mi. ESE Rockaway Inlet	2000 x 2000 yds 35 - 38 ft. deep	50% utilized with construction debris; effect. permit till 6/90	2.2 x 10 ⁸	1.1 x 10 ⁸	4 x 10 ⁶
2. Atlantic Beach	4 mi. S Rockaway Inlet	2000 x 1000 yds. 58 - 65 ft. deep	Active site 1986 - barge crane and construction debris submerged; effect. permit till 9/88	3.6 x 10 ⁸	3.0 x 10 ⁸	10.7 x 10 ⁶
3. McAllister Grounds	5 mi. SW Jones Inlet	Unknown 52 ft. deep	Inactive site			
4. Hempstead Town	3 mi. S Jones Inlet	1000 x 500 yds 70 ft. deep	Effect. permit	9 x 10 ⁷	5.0 x 10 ⁷	1.8 x 10 ⁶
5. Schaeffer Grounds	3 mi. S Fire Island Inlet	Unknown 56 ft. deep	Inactive site; 14,000 wood beer cases submerged 1953			
6. Fire Island	5 mi. SE Fire Island Inlet	1 x .1 mi. 70 ft. deep	Active site; stabilized coal ash submerged 1980. Effect. permit till 7/89	7.5 x 10 ⁷	5.0 x 10 ⁷	1.8 x 10 ⁶
7. Kismet	1 mi. E Fire Island Lighthouse	1000 x 50 yds 25 ft. deep	Inactive since 1977			
8. Oak Beach	100 yds Off Shore	500 x 100 yds 20 ft. deep	Inactive since 1981			
9. Moriches	2.4 mi. SSW Moriches Inlet	450 x 150 yds	Active till 5/85	1.3 x 10 ⁷	1.0 x 10 ⁷	3.6 x 10 ⁵
10. Shinnecock	1.3 mi. E USD.CG Station	420 x 120 ft. 10 ft. deep	Inactive			
11. Shinnecock	2.5 mi. S Shinnecock Inlet	450 x 150 yds 80 ft. deep	Active site Effect. permit till 10/95	1.8 x 10 ⁷	1.5 x 10 ⁷	5.4 x 10 ⁵
12. Smithtown Bay	1 mi W Stony Brook Entrance Buoy	150 x 100 yds 40 ft. deep	Active site Effect. permit till 6/89	2.3 x 10 ⁶	2.0 x 10 ⁶	7.2 x 10 ⁴
						19.3 x 10 ⁶
<i>Total Block (tons):</i>						4.8 x 10 ⁶
<i>Block Tons (25% of reef capacity):</i>						
<i>Ash (tons; at 70% ash in block):</i>						3.4 x 10 ⁶

1. Assumes 35% void space in ash-block site.

Source: Roethel, F.J.

The current absence of adequate disposal and reuse guidelines from EPA and NYSDEC creates confusion and uncertainties that pose far greater obstacles to ash recycling than any technical or engineering problems. For example, the Congress is debating whether or not to declare ash a "special waste". This means the ash disposal criteria will be defined without regard to the results of the EP toxicity test. This approach places the prime emphasis and focus on disposal other than use. The concern then is that Congress may equate reuse with disposal and impose such stringent controls as to preclude innovative and environmentally safe recycling efforts. Ash destined for reuse is now classified as a secondary material and not subject to federal regulation. Hopefully, the Federal government will not proceed without input from the states and localities that are not initiating a variety of test programs, such as the Rolite testing in Islip.

In New York State, DEC has included provisions for ash reuse in Part 360-3.5h (Ash Residue Beneficial Use), effective December 31, 1988. The DEC regulation contains general requirements imposed on the permittee to demonstrate that a market exists and that the intended use will not adversely affect the public health, safety, welfare and the environment.

Although virtually no guidance is provided by NYSDEC on how to proceed, or what criteria NYSDEC will apply in assessing reuse potential, it appears that the DEC regulation implies that some form of permit system will be developed. This "toe in the water" approach may in the last analysis be the best way to go. Since the

state attitude in the entire solid waste history has been to consider it a local problem and a local responsibility except for state mandatory laws, the state at least has allowed for local initiatives and through the New York State Energy and Research Development Authority (NYSERDA) has financed ash characterization and reuse studies.

It is inescapable, therefore, that ash recycling will necessitate a host of pilot projects and the preparation of engineering and environmental guidance based on relevant field experience. The sizable full-scale beneficial use of ash in Europe and Japan is unfortunately of little guidance in the United States because environmental monitoring has been limited. The lack of substantial and credible environmental data to support the formulation of reuse guidelines is a major problem. Conversely, the encouragement of well designed and carefully monitored pilot projects can speed the refinement of engineering practices and provide the data necessary for science based guidance and regulation. The work of the Long Island Regional Planning Board in Part Two of the NYSERDA funded study will test a variety of reuse options in cooperation with the Port Authority of New York and New Jersey, various municipalities, and the Waste Management Institute at SUNY at Stony Brook. The work already undertaken in the fabrication of ash blocks for general building construction and the creation of artificial reefs is already showing promise. The Town of Islip's stabilization project is another.

Another major issue that is not being addressed by any level

of government is the deterrent effect of current environmental impairment liability legislation and potential financial exposure, even when ash utilization is undertaken in accordance with state or federal guidance or regulation.

Conclusions and Recommendations for Ash Management

The management of incinerator ash produced on Long Island will be a major problem in the immediate future due to the shortage of adequate local landfill capacity. The limited number of disposal strategies--landfill disposal, ocean disposal, or off-island export--are severely constrained by siting, political, economic and legal issues. The communities that currently rely on off-Island disposal are now facing high costs with the prospect of much higher costs as these options diminish due to either new federal or state laws or simply due to local citizen opposition in the receiving areas. It is likely that unless more effective management of ash occurs, the current \$40 million spent annually by Long Island Towns could double in the next five years. Therefore, the beneficial reuse of ash as a substitute for aggregate materials in construction applications provides the most cost effective long-term solution for the management of incinerator ash on Long Island. The evidence is clear that the engineering properties of ash are suitable for reuse in numerous construction related activities. Grate ash which contains a smaller proportion of fines than combined ash and exhibits less reactivity is a more desirable engineering material. The environmental properties of ash are of legitimate concern. Such concern though does not apply equally to

all of the separate ash streams that make up the total residue. Grate ash, which comprises 85 percent by weight of the total ash generated, contains no detectable dioxins and furans; much lower concentrations of trace metals; and is less susceptible to leaching or to the release of airborne particulates than is the finer fly ash portion. The concentration of trace metals and the less desirable engineering properties of fly ash may warrant the separation of the grate and fly ash streams if the ash is to be recycled. This will necessitate the separate handling and possible treatment of ash prior to disposal. The addition of source separation programs to remove the major sources of cadmium and lead from the solid waste stream could reduce the concentrations of these metals present in the ash.

Ash utilization in medium applications, where the ash is encapsulated in a binder such as portland cement, (the Rolite technology); or high technology applications in which the ash is vitrified prior to reuse, provides the means to adequately contain trace contaminants within the ash and will prevent any environmental degradation in most reuse applications.

In the interim, there are several non-commercial opportunities. Of immediate benefit to Long Island towns would be the use of treated ash for landfill capping and stabilization. Such use could save these communities at least one-half the cost of managing ash. Beyond question, the beneficial use of ash is a key element in the management of solid waste. However, much remains to be done before recycling of ash becomes a reality.

Several actions are recommended that would help to achieve these goals. They include:

1. NYSDEC should assist the Long Island communities in expediting demonstration projects related to landfills. In particular, NYSDEC should modify existing permit requirements to allow the use of appropriately processed ash for landfill capping and/or stabilization.
2. Long Island communities should begin planning for ash reuse in a more regionally cooperative manner. By working together, the Towns could achieve greater economies of scale in the handling, processing, marketing and disposal of ash materials.

REGIONAL APPROACHES

With the exceptions of a recently agreed upon cooperative venture between the Towns of Huntington and Smithtown where Huntington has incineration capacity and Smithtown has landfill space, and a similar pending contract between the Towns of Hempstead and Brookhaven, and a contract between Babylon and Islip to share incineration capacity, no other long-term agreements exist on Long Island. Each town has been pursuing a solitary path which leaves them either without workable solutions, or choices that are not cost-effective or environmentally sensible. Regional cooperation could provide beneficial economies of scale, maximized recycling efficiencies, and increased redundancy capabilities for the effective management of periodic downtimes for plant maintenance or breakdowns.

Fortunately there are solutions that would be of mutual benefit to all Long Island Towns if local parochialism can be laid aside. First, the costly export of MSW and ash could cease. Second, costs for handling waste would stabilize. Third, sufficient disposal capacity would exist. Fourth, recycling would be enhanced and expanded. (Marketing on a regional scale is far more cost-effective than on an piece-meal basis.) Fifth, regional cooperation is probably the only way of achieving the State's objectives as expressed in the various laws concerning solid waste management.

The above general justifications are sufficient to warrant intermunicipal cooperation on Long Island from environmental and economic standpoints. Even if this were not the case it is almost a certainty that some options will be precluded in the immediate future that will require local solutions to the solid waste crisis. As an example, the New York State Landfill Law itself is the clearest expression of a mandated requirement imposed by the State on the localities without any modification to ameliorate the fiscal impacts on local governments.

The Regional Director of the New York State Department of Environmental Conservation is expected to convene a meeting of all town supervisors by the end of this year for the purpose of discussing the future banning of solid waste export off Long Island. In other words, the garbage that Long Island generates will have to be totally managed on Long Island. The only items that presumably will be eligible for export will be recyclables,

e.g., glass, paper, metals. This has obvious implications for the methods of disposal, as well as, the cost therein. In the following pages several options will be identified under the headings of incineration, recycling, (non-yard waste materials), composting, and construction and demolition debris.

Incineration

At the present time excess incineration capacity exists on Long Island or will exist in the near future that has enabled Huntington and Smithtown, Hempstead and Brookhaven to negotiate cooperative agreements. One of the main reasons that accounts for the surplus capacity is that a considerable amount of MSW is exported off Long Island. This is occurring because the tipping fee now in place is twenty to thirty percent higher than the price that can be obtained by export. Local tipping fees are in the \$75 to \$150 range. The reasons for the differential are quite simple. The local charge reflects the true debt service or the waste to energy incinerators and other related costs. The export charges in large measure reflect out of area landfills that do not require processing, whereby transportation is the major cost. Since a good deal of the transportation costs can reflect marginal savings by virtue of back-haul trucking, (trucks that bring product to Long Island, instead of returning empty, can load MSW for the return trip).

If in fact, out of area shipping is prohibited then incineration capacity on Long Island will no longer be adequate and the proposals for incineration capacity in the Town of Oyster Bay,

and an additional 500 ton per day burn unit in the Town of Islip will be required, unless dramatic improvements are made in recycling and waste reduction.

At the present time, towns such as North Hempstead and Oyster Bay are exporting garbage and it is absolutely accurate that it is currently less expensive than if they were to work with a neighboring municipality that currently has excess incinerator capacity.

However, a second caution must be added to the anticipated prohibition of export either by the receiving states themselves or regulation by the State of New York, and that is the issue of liability. For example, the Town of North Hempstead currently exports 50% of the Towns' MSW which represents baled residential waste which is trucked to several locations at a cost of \$63.50 per ton, utilizing back-haul trucking. The remaining 50% representing commercial waste is shipped loose under contract with Star/Allied of Brooklyn at a cost of \$68.00 a ton. This firm then sorts the loose garbage, recaptures the recyclables and then trucks the remainder to out of area landfills.

The municipalities on Long Island that currently export should be clearly aware of the potential financial exposure they may be subject to if any of these out of area landfills are declared Superfund sites by the Environmental Protection Agency and required to institute remediation programs. The costs could be astronomical and these Long Island towns could be party to a suit since the origin of garbage to these landfill sites is recorded. Even if the

Long Island garbage is theoretically or factually non-toxic and non-hazardous, how will this be determined, and/or proved since it will be co-mingled from many other sources. Just to place this in a slightly clearer focus, it is estimated that if one of the smaller existing landfills on Long Island were designated as Superfund, requiring remediation, the costs could easily be in the fifty million dollar range. Major Superfund sites can reach astronomical costs. This certainly is an issue that should be of concern to local governments.

If the Towns of Islip and Oyster Bay provide their planned incineration expansions then it would be feasible for North Hempstead, Brookhaven, and the eastern five towns of Suffolk County to avoid construction of their own facilities.

Thus one regional incineration scenario that can be contemplated is that North Hempstead work with Hempstead and/or Oyster Bay, whereby all of North Hempsteads non-recyclable and non-compost MSW would be incinerated by Hempstead and/or Oyster Bay in exchange for North Hempstead accepting a pro-rata share of the ash residue. This could work because North Hempstead currently has a 15 to 18 acre site which if prepared with a proper double liner and leachate system would meet State requirements for ash deposit. It must be stressed at this point that the evidence thus far in terms of the Long Island Regional Planning Boards' Comprehensive Ash Study, and the monitoring conducted by the NYSDEC in other areas of the State, indicates that the earlier fears concerning ash are not valid and that this material if properly handled can not only

be landfilled but can be recycled as well.

Certainly this does not connote a cavalier approach to the problem. Incinerators must not only be properly designed and constructed, but they must also have the most competent professional management in operational control, and also be subject to the most stringent monitoring by the State and/or County agencies. Similarly, the transport of ash should also be properly supervised to avoid spillage, etc. In Suffolk County, the Towns of Babylon and Islip are self sufficient and if Islip builds its additional unit they indeed have some surplus capacity. The Towns of Huntington and Smithtown have already addressed their concern. Similarly Brookhaven in conjunction with Hempstead has a workable solution. This leaves the five eastern towns of Suffolk County who fortunately have a small population base and a relatively small generation of waste that would require incineration.

It is the opinion of members of the 208 Task Force that these towns could and should have been excluded from the New York State Landfill Law. Their existing landfills have additional capacity, and they are not located within the deep water recharge zone.

If they are not granted relief by DEC then it is possible that the portion of their waste requiring incineration could be combined with Brookhavens and sent to Hempstead; ~~or~~ shipped to one or a combination of the Babylon, Islip or Oyster Bay facilities.

Through such intermunicipal cooperation, the maximum amount of cost containment can be realized. The example just of the Brookhaven/Hempstead contract produces a potential saving to the

taxpayers of Brookhaven of more than forty million dollars annually, and a corresponding savings to the citizens of Hempstead of six million dollars.

Recycling

A major component in an integrated solid waste management plan is recycling. Some environmental activists insist that recycling should be the total approach to the exclusion of any new incinerator construction. The argument raised is that every addition to incineration capacity detracts from the growth of recycling by virtue of the need to fuel the furnaces rather than recycle the burnable materials. They further argue that recycling is more environmentally sound in that incineration may add to air contamination and the ash residue constitutes a disposal problem. (The previous pages go into discussion of incineration and ash reuse to some length).

The issue here is not to choose sides, but to pose the array of options in order to fathom whether or not tax expenditures can be reduced or contained; and which options offer greater relief. While the debate is being waged it is assumed for the purpose of this study that the recycling goal should be at a 50% recycling rate. The Long Island experience in 1990 was that less than one-half millions tons or 14% of Long Islands more than three million tons of MSW was either recycled or composted. Despite the disparity between goal and accomplishment, it is technically feasible to achieve the state goal. Several issues must be resolved immediately. First of all, the recycling program must be

simple and convenient. The more the resident is expected or required to do, the less compliance will be achieved. Second, the municipalities will have to make recycling programs mandatory. This latter requirement is already in place in most of the Long Island municipalities. However, the various independent programs now in operation are not all simple; nor are they consistent from town to town.

For the purposes of this study it is posed that Long Island start now with a "clean slate". The first step would be to determine what materials would be included in a mandatory program. Obvious candidates are newspapers, corrugated paper and magazines, metal and glass containers, rigid plastic containers and leaf and yard waste. At the very least, grass clippings should be kept on site as mulch. The current generation of mulch producing mowers not only facilitate in situ composting -- but also return the rich nutrients in the clippings back to the lawn thereby reducing the need for additional fertilizer which adds nitrogen to the soil and groundwater aquifers.

There are three components to an effective recycling program; collection, processing and marketing. From an optimal position the program should be uniform throughout Long Island.

Some municipalities require several different distributions of recyclables -- paper in one package, glass in another, etc. The most effective and simple approach is to commingle all curbside collection on a once a week basis. Experience already demonstrates that commingling generates a higher level of compliance than when

homeowners are expect to separate the materials. If public information alone does not achieve a high level of cooperation, then a system of penalties and/or fines may have to be instituted. The collection can be either by municipal or private carters.

All of the collected materials would then go either to a transfer station or directly to a MRF or Materials Recycling Facility where separation, inspection and baling would occur. Although each community could establish its own MRF it would make fiscal sense to use regional or inter-town cooperative facilities. At the MRF, metals would be separated into ferrous and nonferrous and then baled for sale to refineries. Glass would be separated into flint, green and brown glass and placed in roll-off containers for sale. Plastic would be sorted according to resin and then baled for sale. The yard wastes would go directly to permitted municipal or private composting facilities for processing.

Marketing should be conducted by a regional cooperative. One could be established for the two counties, or one for each county - - but the key here is maximum cooperation. The main economic advantage of a regional approach is that Long Island could achieve easier entry to major markets by virtue of volume, uniformity and quality of product. With reliable delivery of higher volumes it is possible to bypass local middlemen and allow Long Island to deal directly with end users such as mills. This approach allows for better prices to the coop and more dependable long term markets. By taking a regional approach municipalities could share in the operation of the coop and benefit from the increased revenues.

However, this is not a perfect world and Long Island is not starting from a "clean slate", sufficient capacity and availability of recycling mills does not yet exist. Nor are there guaranteed markets available on a continual basis. As more communities recycle this should engender the construction of mills to take advantage of the material. For the short term though dislocations do and will exist. This means that although recycling is the environmentally preferable way to go (less threat to air and water and it conserves valuable resources) it is not necessarily the cheap way to go, or a money-maker for local governments. In the long term however, after MRFs are in place, regional coops established and additional mills constructed, recycling should become more cost-effective and may even turn a profit.

Thus, the public policy consideration for Long Island is which direction shall the area choose; since the municipalities are truly at the decisional crossroads.

The previous section on incineration posed one array of choices, which included new incineration facilities for Oyster Bay and Islip. If this path is followed then a portion of material that might be recycled will be lost. Conversely, if recycling is not seriously pursued then incineration capacity must be increased for all the reasons mentioned.

In this section a scenario for recycling is offered for the purpose of stimulating thought and debate and to demonstrate that regional cooperation can be feasible.

For example, in Suffolk County, the towns of Babylon and Islip

could provide the infrastructure for a cooperative entity and joint marketing, since they already have much of the infrastructure in place. All of the other towns would coordinate collection and delivery systems. Brookhaven which has its own MRF could nevertheless join the cooperative marketing effort.

In Nassau County, Hempstead could play a central role in a similar county-wide program. It is even feasible for all municipalities to join a single Long Island marketing effort.

This approach based on the concept of centralized processing, distribution and marketing is designed to take full and immediate advantage of existing facilities and those now under construction.

Cooperative Costs

All costs associated with centralized operational functions, i.e., processing, transport, storage and marketing would be pro-rated between Towns on an actual tonnage delivered basis. Capital costs to construct and equip would be pro-rated on a per capita basis. Those Towns which have not yet instituted recycling collection would pay little toward operations in the early years, but would pay a full pro-rated share of capital costs based upon their population. Home collection costs would not be included in the regional formula. See Appendix B for a cost allocation formula.

Town cost shares for both operations and capital contributions would be expressed by mathematical formula. Operational expenses at the Islip Multi-Materials Recycling Facility (MRF) and Babylon Distribution Center and Brookhaven MRF would be subject to audit

by all participating Towns. Grant funding or capital contribution by the State or other entities would be used to offset gross operational expenses or capital costs as the case may be.

Similarly revenues from re-sale of materials would off-set gross operational expenses, or increase such expenses in the case of a negative market.

Marketing policy and quality control standards would be jointly developed by the administrative committee of the cooperative and approval by the supervisor of each town, sitting as the Cooperative Board of Directors. See Appendix C for a draft inter-municipal agreement.

Of course, it is important to realize that the relative success of inter-municipal solid waste management is going to depend on state involvement and cooperation.

State Role

First and foremost, DEC must insist on a comprehensive county-wide solution as a prerequisite for granting relief to any town. The State could also assist in coordinating and supporting the necessary set of agreements--and to exercise the influence and power of the State if required.

The State DEC must also accept the concept of ash treatment and landfilling under cleanfill exception (ECL27-0704.6), and expedite development of a reasonable and achievable standard for ash product. DEC can do so under local exceptions, for example through R&D permits and/or consent order if statewide application is not feasible. If regional solutions are to happen, DEC must be part of the solution, not part of the problem.

It would also be essential for DEC to prioritize and expedite the necessary permits. Time is short, expenses are high, and everyone is under the gun. We must all work together, and now.

Cost Comparisons

In June of 1990 the Town of Islip proposed a conceptual plan for regional solid waste management.

The following Tables are means to demonstrate the cost savings that would accrue to all the Towns through regional cooperation if this Islip proposal is accepted. One added benefit beyond cost is the fact that the program is based on the concept of fair share. No municipality is asked to assume a disproportionate share of the land use consequences of siting or capital investment. This is one of those rare instances where everyone can win.

The participating towns could realize a net savings of more than one-quarter of a billion dollars in the next three years (1991-1993) if Islip's plan is implemented.

The major focus of this working paper has been on the "large picture" issues since it is not the task of the Commission to design the definitive solid waste comprehensive management plan. However, from a cost point-of-view it is important that communities do not lose sight of small economies as well. Particularly when these 'small' economies can amount to millions of dollars. Therefore two examples follow in order to indicate advantages of non-disposal recycling and the potential advantages of more emphasis on privatization. The concluding pages discuss several of the administrative and regulatory actions that are also essential if Long Island communities and their citizens are to be well-served.

Table 20
Cost Comparison of Current Practice vs. Islip Plan
1991

<u>Program</u>	<u>Brookhaven</u>	<u>Eastern Towns</u>	<u>Huntington</u>	<u>Islip</u>	<u>Smithtown</u>
<u>Projected Costs MSW</u>	600 ^K Tons	210 ^K Tons	240 ^K Tons	100 ^K Tons	130 ^K Tons
Current Law	\$66.M	\$23.1M	\$26.4M	\$13.0M	\$14.3M
Islip Plan	\$15.M	\$ 6.3M	\$ 7.2M	\$ 3.5M	\$ 3.9M
<u>Projected Ash Costs</u>				55 ^K Tons	
Current Law				\$ 6.3M	
Islip Plan				\$ 3.7M	
<u>Projected Costs Cleanfill</u>		15 ^K Tons	20 ^K Tons	40 ^K Tons	15 ^K Tons
Current Law		\$.4M	\$.6M	\$ 1.0M	\$.4M
Islip Plan		\$.4M	\$.6M	\$ 1.2M	\$.4M
Total Savings	\$51M	\$16.8M	\$19.2M	\$10.4M	\$10.4M
Additional Revenue	\$20.4M				\$ 1.8M

Table 21
Cost Comparison of Current Practice vs. Islip Plan
1992

<u>Program</u>	<u>Brookhaven</u>	<u>Eastern Towns</u>	<u>Huntington</u>	<u>Islip</u>	<u>Smithtown</u>
<u>Projected Costs MSW</u>	618 ^K Tons	216 ^K Tons	247 ^K Tons	108 ^K Tons	134 ^K Tons
Current Law	\$74.2M	\$25.9M	\$29.6M	\$13.0M	\$16.1M
Islip Plan	\$16.7M	\$ 6.9M	\$ 7.9M	\$ 3.5M	\$ 4.3M
<u>Projected Ash Costs</u>				55 ^K Tons	
Current Law				\$ 6.9M	
Islip Plan				\$ 4.0M	
<u>Projected Costs Cleanfill</u>		16 ^K Tons	21 ^K Tons	43 ^K Tons	16 ^K Tons
Current Law		\$.4M	\$.7M	\$ 1.2M	\$.4M
Islip Plan		\$.4M	\$.7M	\$ 1.4M	\$.4M
Total Savings	\$57.5M	\$19.0M	\$21.7M	\$12.2M	\$11.80.9M
Additional Revenue	\$22.6M				\$ 2.1M

Table 22
Cost Comparison of Current Practice vs. Islip Plan
1993

<u>Program</u>	<u>Brookhaven</u>	<u>Eastern Towns</u>	<u>Huntington</u>	<u>Islip</u>	<u>Smithtown</u>
<u>Projected Costs MSW</u>	637 ^K Tons	222 ^K Tons	10 ^K Tons	13 ^K Tons	8 ^K Tons
Current Law	\$82.2M	\$28.9M	\$ 1.3M	\$ 1.7M	\$ 1.0M
Islip Plan	\$18.5M	\$ 7.6M	\$ 0.3M	\$ 0.4M	\$ 0.3M
<u>Projected Ash Costs</u>			89 ^K Tons	93 ^K Tons	45 ^K Tons
Current Law			\$12.0M	\$12.6M	\$ 6.1M
Islip Plan			\$ 6.8M	\$ 7.1M	\$ 3.4M
<u>Projected Costs Cleanfill</u>		17 ^K Tons	23 ^K Tons	46 ^K Tons	17 ^K Tons
Current Law		\$.5M	\$.8M	\$ 1.3M	\$.5M
Islip Plan		\$.5M	\$.8M	\$ 1.6M	\$.5M
Total Savings	\$64.3M	\$21.3M	\$ 6.2M	\$ 6.5M	\$ 3.4M
Additional Revenue	\$ 8.6M				\$ 2.4M

Table 23
Summary Cost Comparisons of Current Practice
1991, 1992, 1993

	<u>1991</u>	<u>1992</u>	<u>1993</u>
Total Cost of Current Practice	\$149.5M	\$168.4M	\$148.7M
Total Cost of Islip Plan	\$ 41.7M	\$ 46.2M	\$ 47.8M
Total Suffolk Savings	\$107.8M	\$122.2M	\$100.9M

These costs and savings are conservative and are based on the following list of assumptions.

1. Cost of Off-Island Disposal MSW

1991 - \$110.00 per ton
1992 - \$120.00 per ton
1993 - \$130.00 per ton

2. Cost of Off-Island Disposal Ash

1991 - \$115.00 per ton
1992 - \$125.00 per ton
1993 - \$135.00 per ton

3. Five percent of waste stream assumed to be by-pass needing landfill.

4. Waste growth rate three percent per year.

5. Brookhaven tipping fee to be:

1991 - \$45.00
1992 - \$50.00
1993 - \$55-80

6. Islip Processing and Cleanfill Costs

1991 - \$68.00
1992 - \$72.00
1993 - \$76.00

7. Smithtown Cleanfill Tipping Fee

1991 - \$30.00
1992 - \$32.00
1993 - \$34.00

8. Cost of Islip, Smithtown and Brookhaven tipping in own facilities presumed to be:

1991 - \$25.00
1992 - \$27.00
1993 - \$29.00

9. East End uses Southampton as cleanfill.

Non-Disposal Recycling

One promising area of reuse and recycling cost containment is the refilling of laser printer cartridges. The Town of Islip, which operates 18 laser printers, is a typical case in point. On the average, a cartridge is used up every one and one-half months. If the Town proceeds to refill these cartridges (which can effectively be achieved five times with minimal loss of quality) the result would be between \$30,000 and \$40,000 cost saving to the Town, reflecting the difference between the price of a new cartridge and the cost for refilling; and at the same time, achieving an 80% reduction in the disposal of spent plastic cartridges. If this scenario were to be repeated throughout all units of government, let alone the private sector, a net saving in the millions of dollars could be achieved on Long Island annually. A spin-off benefit would be the creation of additional jobs here on Long Island for the companies carrying out the refill.

Privatization

A second area of cost containment to municipal governments is in the use of waste-to energy clean wood debris combustion. For example, a proposal has been pending several years in the Town of Brookhaven by a private corporation that currently receives yard waste in which the solids-branches, tree trunks, etc.--are shredded for woodchips and/or mulch that have a beneficial recycling application for landscaping and other groundcover purposes. This firm has proposed the construction of an incineration facility that

would use clean wood construction debris and other similar wood products such as pallets, etc., for fuel which would produce energy as a bi-product to be sold to LILCO. One such facility could generate enough electricity to supply the need for several thousand homes. More to the point, this private operation would greatly relieve the cost and burden on the municipal highway department, let alone avoid the need for landfilling. Although exact estimates of tax savings can not be accurately computed at this time, it is obvious that such a venture, run by the private sector, is a good example of privatization and could yield significant expenditure savings on the part of local government. See Appendix D.

Administrative and Regulatory Needs.

1. Uniform tipping fees by waste type - The region has MSW tip fees ranging from \$0 (Smithtown) to \$80 (Islip, Hempstead, Oyster Bay) with projected fees ranging higher (Huntington) and other fees held artificially low (Oyster Bay, some East End Towns). The result is a strong tendency for waste, especially commercial waste, to migrate to facilities with the lowest fees. Consequently all planning units are somewhat unsure of their current generation within the unit, and particularly their projections for future waste generation.

If all fees were uniformly set by category (with different numbers for recyclables, yard wastes, construction debris and MSW) future needs could be projected more accurately. Waste generation could be related to economic indicators for the first time.

Currently, it is hard to justify additional facilities when

the waste it should handle is going elsewhere. Last year for instance, Islip could have justified a third combustor based on excess waste. This year it is not the case. next year the demand could change again.

The migration of garbage from Town to Town would certainly end if the fees were all uniform. The simple way to do that would be a single system regional authority which holds all debt and sets fees. Short of that, the Towns need a consensus target fee that each system can set, with a clear understanding that new facility construction must target that consensus fee in order to proceed.

2. Regional Licensing of Carters, Transfer Stations and Regional Flow Control. - Besides garbage moving from Town to Town three other problems have defied enforcement efforts.

a. Out of State waste flow is steady, sometimes very heavy, but always in danger of being closed off by other jurisdictions; thereby raising prices and flooding local facilities with more waste. it is not only a spot market subject to rapid short term price fluctuations, but a black market as well, often unlicensed and undisclosed. While it may even be desirable to have some private capacity to move waste off-Island it is important that it be controlled, measured, and directed to public facilities when needed. The Towns are geographically too small to enforce ordinances against entities which operate on a county-wide or multiple jurisdiction basis.

Transfer operations are licensed by the State, but the local planning units are too limited in legal jurisdiction to control the

flow from licensed operations. The State, not being otherwise directed by the Legislature, continues to regard this as a strictly local concern.

b. The unlicensed, illegal operators who move waste, sometimes just pile it up and walk away, and also take advantage of limited jurisdiction to avoid enforcement. The worst offenders so far have been the construction debris "recyclers" who move from site to site and jurisdiction to jurisdiction. Tire "recyclers" have done the same. DEC is too understaffed, or not sufficiently aggressive to get the consent orders necessary to stop this practice. Local enforcement has to be more responsive and more aggressive; but it needs to be regional if it is to be effective.

c. Criminal and quasi-criminal activity within the carting industry has escaped serious damage from law enforcement for decades. This includes a broad range of misconduct by individual carters and at times organized crime. This includes bribes to municipal employees, heavy handed customer relations, collusive bidding, and various kinds of squeeze plays inflicted on small carters.

Criminal convictions are hard to come by, and often the cases that can be made do not result in the level of penalties which would effectively deter similar conduct, or change the nature and structure of the industry. To be sure, the mere fact of prosecution does some good. The industry has largely been on its best behavior recently, coinciding with the Eastern District's RICO action, and before that with the Attorney General's Task Force

prosecution. Unfortunately these prosecutions end up as holding actions since it is business as usual until there is a significant conviction and punishment.

The best, and perhaps the only effective way to control the carting industry involves a close coordination between criminal enforcement and administrative enforcement of licensing regulations. By way of example, Islip landfill employees were bribed to allow free tipping for five carting firms in 1984-86. The Suffolk District Attorney obtained indictments and convictions by 1987. Consequently, the Town recovered \$700,000 from the defendants in a civil RICO suit and successfully revoked their licenses to collect waste in Islip. Unfortunately at least two of these defendants are still doing business in other Towns. Since the convictions were not all felonies, the actual guilty pleas were to lesser offenses, and the defendants had ostensibly "good" records in the other Towns, even if officials in those Towns felt they just hadn't been caught yet.

In any event, it was a powerful regulatory tool blunted by lack of regional jurisdiction. One licensing entity for the region, or even each County, could have put these violators out of business everywhere on the same evidence. The point is that a regional licensing approach would help solve several problems if adequately funded and professionally staffed.

3. State-Local Communication and Size of Planning Units. -

Under State law the DEC is directed to identify the local planning units who are best suited and able to carry out State policy. On

Long Island these units are the Towns, although elsewhere they identify counties and the City of New York. At the same time the policy is to encourage cooperation between municipalities. That is fine as far as it goes, but it doesn't go that far.

The unresolved policy issue is how to ensure that State policy on integrated waste management will be realized for all, not just some, Long Island Towns. To put it another way, how will situations be handled where some cooperative activities succeed and others fail. Do we scale back the policy to fit political, demographic and geographic reality? Or do we keep trying even if it takes ten years? Who makes the decision?

The frustrating aspect of the cooperative efforts of the past year is the absence of anyone on the DEC side with both detailed knowledge of the region and authority to act. The Commissioner personally is the only individual who can really act has not delegated much to the Regional Office. But he is limited in his information, having to rely on a variety of bureaus within the Department to know what's possible, and unfortunately, the Regional Office doesn't demonstrate a thorough and comprehensive mastery of the facts and interrelationships.

WHETHER LONG ISLAND EVENTUALLY ESTABLISHES A REGIONAL AUTHORITY, OR AN ADVISORY REGIONAL COUNCIL, OR NASSAU AND SUFFOLK COUNTY OPERATIONS THROUGH THEIR DEPARTMENTS OF PUBLIC WORKS IT IS EMINENTLY CLEAR THAT COST CONTAINMENT AND TAX RELIEF CAN ONLY BE ACHIEVED THROUGH ONE FORM OR ANOTHER OF INTERTOWN COORDINATION ACCOMPANIED BY CLEAR AND SUPPORTIVE COOPERATION AND ASSISTANCE FROM THE STATE.

Appendix A

Regional Reports

Phase 1 of a study co-funded by the New York State Energy Research and Development Authority, and the Towns and County governments of Nassau and Suffolk was initiated in 1987 under the project direction of the Long Island Regional planning Board. The purpose of the study and demonstration project was to identify and field test potential uses of ash from waste-to-energy facilities, based on the physical and chemical characterization of the ash. The Board and its consultant, Chesner Engineering, with supporting input from the Solid Waste Institute of the Marine Sciences Research Center at SUNY at Stony Brook completed seven detailed volumes and an executive summary.

They are:

- Volume 1: Long Island Ash Management Status
- Volume 2: Sampling and Testing Procedures
- Volume 3: Environmental Property Data
- Volume 4: Engineering Property Data
- Volume 5: Environmental Assessment
- Volume 6: Engineering and Economic Evaluation
- Volume 7: Institutional Assessment
- Executive Summary: Ash Management and Utilization Program

The Executive Summary highlights the major findings of the seven volumes and describes the chemical and physical tests and the resulting characterization of the various ash components. It also identifies potential reuse applications and markets. Major recommendations are set forth for statutory changes and new institutional structures necessary.

Appendix B

Cost Allocation Formula

$$\text{Operations per Town} = \frac{\text{Town Tonnage Delivered}}{\text{Actual Tonnage All Towns}} \times \text{Operations Cost}$$

where

Operation Cost = Labor & Maintenance & Utilities & Transport

$$\text{Capital Cost per Town/year} = \frac{\text{Town Population}}{\text{Regional Population}} \times \left(\frac{\text{Regional Capital Investment}}{20} \right)$$

where

Regional Capital Investment = Islip Facility + Babylon Facility
+ future investment in equipment, vehicles, etc.

$$\text{Total Cost/Towns (annual)} = \text{Operations per Town} + \text{Capital per Town}$$

Appendix C

Intermunicipal Agreement Establishing the
Long Island Regional Recycling Cooperative

Among

Town of Babylon, Town of Huntington,
Town of Islip and Town of Oyster Bay

Dated as of September 1, 1990

INTERMUNICIPAL AGREEMENT

This Intermunicipal Agreement, made and entered into as of September 1, 1990, among the Town of Babylon, the Town of Huntington, the Town of Islip, the Town of Oyster Bay (the "Towns") each of which is a political subdivision of the State of New York, each having their principal offices at their respective Town Halls:

WHEREAS, pursuant to Article 5-G of the General Municipal Law, the Towns are authorized to agree among themselves to perform certain municipal activities on a cooperative basis;

WHEREAS, the Towns desire to coordinate their municipal recycling activities so as to maximize the value of their recycled materials and to achieve other efficiencies of operation, thereby minimizing the costs to the residents of the Towns of the disposal or recycling of various materials;

WHEREAS, each of the Towns' desires to agree to coordinate their activities by means of an intermunicipal agreement among them with respect to the recycling of certain materials;

WHEREAS, the coordination of activities, over time, is expected to be to the economic benefit of each Town and will serve a public purpose of each Town;

NOW, THEREFORE, in consideration of the premises and the respective representations and agreements hereinafter contained, the parties hereto agree as follows:

ARTICLE I DEFINITIONS AND REPRESENTATIONS

Section 1.1 Definitions. The following terms shall have the following meanings in this Agreement:

"Act" means Article 5-G of the General Municipal Law of the State, as amended from time to time.

"Administrative Committee" means the committee composed of representatives of each of the Towns having the responsibilities described in Article III hereof.

"Cooperative Activity" means the provision of any work, service or material by a Town pursuant to the Agreement.

"Cooperative Committee" means the Committee composed of the Town Supervisors of each of the Towns having the responsibilities described in Article II hereof.

"Executive Officer" means the executive officer chosen by the Cooperative Committee and who shall serve as chairman of the Administrative Committee.

"Expense" means an expenditure by any of the Towns for which such Town is entitled to reimbursement under the Agreement, or an expenditure by the Fiscal Officer.

"Fiscal Officer" means the Controller of a member Town when acting pursuant to the Agreement.

"Long Island Regional Recycling Cooperative" or "Cooperative" means the organization created by this Agreement and composed of the member Towns. Membership shall be open to any Town situated in the Counties of Nassau or Suffolk which shall evidence its willingness to participate by a duly adopted resolution of the Town Board of said Town.

"Recyclables" means matter which may be sold by any Town for subsequent use or processing and use.

"Revenues" means any monies received by or on behalf of any of the Towns which pursuant to the Agreement is to be accounted for hereunder as the product of a Cooperative Activity, or any monies received by the Fiscal Officer.

Article II COOPERATIVE COMMITTEE

Section 2.1. Establishment. There is hereby established by the Towns a Long Island Recycling Cooperative, which shall be governed by a Cooperative Committee composed of the Supervisors of each of the member Towns.

Section 2.2. Membership. Each Town Supervisor is a member of the Cooperative Committee by reason of such status as Town Supervisor, and shall serve as a member of the Cooperative Committee for the duration of his or her term as Supervisor.

Section 2.3. Quorum and Majority. Unless otherwise indicated herein, the Cooperative Committee shall act by majority vote of the members present at any meeting. No meeting may be held without a majority of members present. Members may not be physically present, but may attend by telephonic means, provided that each member present can hear and speak to each other member during such meeting.

Section 2.4. Notice of Meetings. The Executive Officer shall give each member of the Cooperative Committee at least three days notice of any meeting, provided, however, that any member may waive the failure of the Executive Officer to have given such notice to such member.

Section 2.5. Powers of the Cooperative Committee.

1. The Cooperative Committee may determine to (a) employ, engage, compensate, transfer or discharge necessary personnel, subject, however, to the provisions of the civil service law where applicable; (b) determine to make employers' contributions for retirement, social security, health insurance, workers' compensation and other similar benefits available to such personnel, and may approve of attendances at conventions, conferences and schools for public officials and the approval and pay for travel and other expenses incurred in the performance of official duties, all from available revenues; (c) require the bonding of designated officers and employees and the filing of oaths of office and resignations consistent with general laws applicable thereto; (d) may make provisions that for specific purposes designated officers or employees shall be deemed those of a specified Town; (e) may make provisions that personnel shall possess the same powers, duties, immunities and privileges that would ordinarily possess (i) if they perform their duties only in the Town by which they are employed or (ii) if they were employed by the Town in which they are required to perform their duties; (f) adopt such by laws for the conduct of Cooperative Business as it may deem proper.

2. The Cooperative Committee may determine to provide for the establishment, operation and maintenance of the joint collection (from any of the Towns), processing and sale of Recyclables throughout each of the Towns.

3. The Cooperative Committee may determine to fix and collect charges, rates, rents or fees, where appropriate, and may determine to make and promulgate rules and regulations and provide for their enforcement by or with the assistance of the Towns. The Cooperative Committee may conduct hearings and determine issues raised thereat.

4. The Cooperative Committee may delegate to the Administrative Committee all responsibilities with respect to the immediate supervision and control of any of its activities described in paragraph 1, 2 or 3 of this Section 2.5.

5. The Cooperative Committee may determine to require that the Cooperative deliver and sell its recyclables to any person or persons selected by the Cooperative Committee, at such price or prices as the Cooperative Committee shall determine.

Section 2.6. Status of Determination. None of the actions of the Cooperative Committee shall impose any monetary or other obligation of a member Town without the approval and assumption of such obligation by the Town Board of such Town. The Cooperative Committee shall propose contracts and agreements to the Towns implementing its determinations from time to time for consideration and approval thereby.

Section 2.7. Annual Budget, Fiscal Year. The Cooperative Committee shall establish a fiscal year and shall adopt a budget of revenues and expenditures in each such fiscal year. The budget shall allocate the shares of revenues and expenditures of the Cooperative, including expenses for administration, and any joint contributions toward the payment of debt service on any capital projects, and any lease payments or other expenditures, on an equitable basis, to each of the member Towns.

ARTICLE III
ADMINISTRATIVE COMMITTEE

Section 3.1. Establishment. There is hereby established by the Towns an Administrative Committee composed of two representatives of each Town, which representative may be the Supervisor or any other officer or employee of such Town.

Section 3.2. Membership. Each member of the Administrative Committee shall serve at the pleasure of the respective Town Supervisor, and membership in the Administrative Committee shall be evidenced by the filing with the Executive Officer of a certificate of such Supervisor designating such member.

Section 3.3. Quorum and Majority. Unless otherwise indicated herein, the Administrative Committee shall act by a majority vote of the members present at any meeting. No meeting may be held without a majority of members present. Members need not be physically present, but may attend by telephonic means, provided that each member can hear and speak to each other during such meeting.

Section 3.4. Notice of Meetings. The Executive Officer shall give each member of the Administrative Committee at least three days notice of any meeting, provided, however, that any member may waive the failure of the Executive Officer to have given such notice to such member.

Section 3.5. Powers of the Administrative Committee. The Administrative Committee may act on behalf of the Cooperative committee to the extent authority has been delegated to the Administrative Committee by resolution of the Cooperative Committee, with respect to any of the activities described in

paragraphs 1, 2 or 3 of section 2.5 of the Agreement. The Administrative Committee may recommend actions to the Cooperative Committee with respect to matters for which responsibility has not been delegated to the Administrative Committee.

ARTICLE IV
EXECUTIVE OFFICER

Section 4.1. Designations. The Cooperative Committee shall designate an employee or officer of any of the Towns or any other individual as the Executive Officer of the Cooperative Committee to serve as such at the pleasure of the Cooperative Committee, or pursuant to such terms as the Cooperative Committee may determine.

Section 4.2. Duties. The Executive Officer shall coordinate the activities of and conduct the meetings of the Administrative Committee, shall attend meetings of the Cooperative Committee and shall formulate and implement a plan for the efficient operation of the activities of the Cooperative Committee and of each of the Towns with respect to such activities.

ARTICLE V
FISCAL OFFICER

Section 5.1. Designations. The Cooperative Committee shall designate any Fiscal Officer of any of the Towns as the fiscal officer of the Cooperative Committee to serve as such at the pleasure of the Cooperative Committee.

Section 5.2 Duties. The Fiscal Officer shall maintain the funds and accounts which shall come under the control of the Cooperative Committee pursuant to the terms of the Agreement. The Fiscal Officer shall make such payments and accept such collections as may be necessary to implement the activities of the Cooperative Committee.

Section 5.3. Claims. Claims made against the Towns in connection with the activities of the Cooperative Committee shall be audited by the Fiscal Officer.

Section 5.4. Amounts Due and Payable to Towns. The Fiscal Officer shall maintain an account in the name of each of the Towns detailing the amounts owed by each such Town to each of the other Towns pursuant to the activities of the Cooperative Committee and shall, on a regular basis, prepare reports for submission to the Administrative Committee and the Cooperative Committee showing such net amounts due.

ARTICLE VI
MISCELLANEOUS

Section 6.1. Term. This Agreement may be terminated if agreed to by a favorable vote of an absolute majority of the members of the Cooperative Committee, provided that the outstanding obligations of the Cooperative shall have been satisfied and further provided that the Fiscal Officer shall have distributed to the Towns all amounts then held by such Fiscal Officer at the direction of the Cooperative Committee.

Section 6.2. Amendments. This Agreement may not be amended except by the resolutions of each of the Towns consenting to such amendment.

Section 6.3. Effective Date. This Agreement shall become effective on the date by which each of the Towns shall have adopted a resolution approving its execution and each of the Supervisors of the Towns shall have executed the Agreement on behalf of their Town.

Section 6.4. Withdrawal. No Town may withdraw from this Agreement while any contract requiring its participation is in effect. In the absence of such contract, any member may withdraw upon reasonable notice to the Cooperative Committee.

IN WITNESS WHEREOF, we have set our hands this _____ day of September, 1990.

TOWN OF BABYLON

By: _____
Supervisor

TOWN OF HUNTINGTON

By: _____
Supervisor

TOWN OF ISLIP

By: _____
Supervisor

TOWN OF OYSTER BAY

By: _____
Supervisor

Privatization

While the most visible and significant response to the solid waste crisis of the past decade has been the sharply increased level of capital investment by municipalities in construction of new facilities, an important role has been played by the private sector in collection, recycling, composting, co-generation of power, and transport of waste. There remains a significant role for the private sector in cost containment for solid waste management on Long Island, although the task of defining and expanding that role, while minimizing the possibility of conflict with municipal programs, will be difficult.

While municipal programs make extensive use of private firms as vendors or operators, there are several operating facilities, and several others in the planning stages which could play useful roles in relieving local government of some of the burden of waste management. These facilities are privately sited, funded, and operated, often with innovative technologies and business risks which government could not be expected to assume. Some of the advantages of private development include greater speed in decision making than municipal projects can typically demonstrate, and greater insulation from some of the political scrutiny and/or opposition which government projects usually attract. Private development offers virtually the only arena in which new and unproven technologies may be tested and matured, since government projects are often the necessary product of consensus decision making.

The difficulty lies in the need to coordinate the actions of the private sector with those of government in order to avoid direct and debilitating competition between public and private facilities offering the same services. The role of flow control legislation, for example, has been to offer assurance to the financial community and vendors that a facility, once constructed, will be able to generate enough revenues through fees on the waste stream to be viable. The essence of the concept is monopoly, total control of all waste for purposes of financial self-protection. Government is therefore empowered to allow or disallow the participation of the private sector in certain areas of solid waste management, a power which it may or may not decide to exercise. On Long Island the situation is compounded by the presence of so many different municipal entities. The result has been to both encourage and discourage private sector initiatives. The balance is not easy to strike.

Some examples of private facilities, their advantages and disadvantages, are as follows.

A. The Calverton MSW Composting Facility in Riverhead. This facility, now in the final stages of permitting, will be built on a private site with no public funding. Its capacity will apparently be great enough to serve the waste disposal needs not only of Riverhead, but of two or more other East End Towns, and possibly some waste from the Town of Brookhaven. It has been

advanced with a speed and lack of controversy remarkable for Long Island. The facility has not yet been financed and discussions are underway to arrive at contractual understandings between the owners of the facility and the local governments likely to be served, or affected, by its operation. The technology, while common in Europe is essentially unproven in the United States, and would not have been developed for application to the East End had local government been forced to site and finance it. It offers a potential long term solution to Riverhead's waste disposal and recycling problem without the investment of public funds.

Risks involved in the facility from the Town's point of view would include an inability to completely control the tipping fees charged, and an absence of direct involvement in operations. If the facility were to be closed for any reason, the Town would be left without another local option. Conversely, the Company could be subject to the competition of another private facility, or indeed of another Town facility if economic opportunities make such competition feasible. While these risks are undoubtedly greater for both the developer and the municipality than would be the case in a traditional public works project, both sides appear ready to take them, offering the remainder of the region instruction in a new means of procurement.

B. Privately Operated Recycling Facilities. There are presently a number of licensed recycling centers operating on Long

Island. These facilities compete for recycled materials and MSW collected by private carting firms, and in some cases for municipal waste. They are often used as brokers for municipally collected recyclables, and very frequently offer long haul disposal services as well as material sorting and marketing. They are effective in handling large tonnages of material on a routine basis, although they are often reluctant to report actual tonnages to municipalities and they are not responsible for achieving any particular recycling rate as are municipal programs. There is no means of compelling this sector of the recycling economy to handle any particular commodity for any period of time, and if market conditions warrant, activity can cease altogether.

Reliance by local government on these facilities does not offer tremendous benefit in terms of pricing, in fact, at times, quite the opposite. They are, however, easier to site and permit than public facilities. They are fertile sources of technical innovation, and they are privately financed.

C. Co-generation Wood Burning Facilities. At least one such facility, operated by Hubbard Sand and Gravel in Islip is presently operating. Others have been proposed in other locations and may now be in various stages of development. Like the other facilities discussed above they offer the advantage of private siting and financing, although they do not offer the promise of disposal of large tonnages of MSW, being limited to wood waste as a fuel, and

in many cases clean, unpainted wood at that. One of the major incentives for construction of these facilities is the relatively high rate of return for energy produced. To this extent the cogenerators are dependent upon the continued support of the Public Service Commission in maintaining a high floor rate for electricity sales. The other economic incentive at work is simply high regional tipping fees for all other disposal methods. A cogenerator can derive significant revenue from tipping fees at the gate while demanding uncontaminated fuel, by setting his fee slightly less than competitive facilities.

D. Collection and Long Haul Transport Firms. Many of the larger carting firms in the region and several independent trucking firms offer long haul disposal of waste or ash to out of state landfills. While the wisdom and utility of long haul disposal is discussed elsewhere in this report, it is clearly beneficial to municipal waste programs to be able to take advantage of readily available waste transport in the event of short or long term emergency. The costs, including personnel, associated with the purchase and maintenance of a fleet of waste transports large enough to handle several days waste generation are prohibitive for most Towns. The need to rely upon this private sector service can be expected to recur annually in the late spring and summer, at times of equipment breakdown, and in instances where planned facilities, however essential they may be considered, for some reason do not obtain approval.

As is discussed elsewhere, the difficulty in long term reliance upon this service is the effective abandonment of self determination in waste management. Once the decision is made to export significant fractions of the waste stream on a permanent basis, the ability to control costs on Long Island is passed to officials in the states to which it is sent. While some wastes, from some local jurisdictions will be sent on long journeys at least part of the year, all efforts should be made to minimize this amount.

E. Low-Tech Composting Facilities. Unlike the high capital composting facility proposed for Riverhead, low-tech, low cost composting facilities for leaves, wood, and grass are a consideration for the region, if not as the main disposal point for these materials, then as a supplement to the municipal response. These facilities may be characterized by moderate investment in equipment such as chippers, payloaders, trucks, etc., but not in major construction of buildings and large paved areas. Out door windrow or static pile composting is underway at some private locations in Suffolk County at present, serving the landscaping industry. The current economic forces driving these facilities are the high overall waste disposal costs to landscapers. These forces are supplemented by State mandates to municipalities to remove yard wastes from the waste stream, and the difficulties encountered by municipalities which attempt to develop composting facilities of their own.

Problems associated with these facilities tend to focus on odor and the ability of the facility to manage its inventory. Due to the relative newness of the technology for the operators, local government, and the NYSDEC, it is difficult to foretell whether a given operation will be able to secure and maintain the necessary permits, and maintain itself as a going concern over a period of years. Moreover, the total amount of yard wastes in the waste stream is far larger than the present aggregate capacities of all private sites. Even if all landscapers wastes were served through private composting, well over half the total wastes, i.e. the municipal, residential fraction would remain.

There is presently no planning entity which is charged or authorized to allocate fractions of the yard waste stream to private or public facilities, and no active role on the part of the NYSDEC to explore and resolve these questions. Indeed, a sizeable fraction of the region's yard wastes are now shipped off-Island for composting, at costs which are effectively higher than those charged for shipping ordinary mixed garbage, when the extra cost of separation by special collection is taken into account. A major reason for this is a hesitancy by both private and governmental entities to develop local facilities for fear of uncertain regulatory policy and potentially destructive competition.

The Private/Public Balance. The ideal system would take advantage of private sector entrepreneurial innovation and capital,

while providing both a steady revenue stream to municipalities and a stable atmosphere for private development. Such a balance may come through the clash of diverse interests which prevails today, but it would be preferable to regionalize the debate and establish some mechanism to broker the necessary agreements to reduce conflict.

