

Interim Report by the Economics Sub-Committee to the Comprehensive Solid Waste Management Plan Working Group

For discussion on 11 April 2003

Submitted by Harold Ward, on behalf of the Sub-Committee

The Economics Sub-Committee (hereafter Sub-committee) is the first to report to the Working Group. Because our task encompasses the full range of solid waste management and because some of the information we require is still being developed, our work is not yet complete. Thus, what we report here is a work-in-progress, to be followed at a later time with a more complete analysis.


Methodology

The enabling legislation for the Rhode Island Resource Recovery Corporation declares in RIGL § 23-19-3 that source reduction and recycling are preferable to land disposal. The current rate of municipal recycling is 14.5% (which doesn't include composting, because we don't have good data on the amount of waste that is composted). The 1996 comprehensive plan projected that by 2002 the municipal recycling rate would be 35%.

The Sub-Committee first undertook to identify the economic circumstances and incentives for each sector of solid waste management, and to evaluate whether these are likely to motivate actors in each sector to work toward the legislative goal. We have not completed this task for all sectors – in part because the comparatively limited time allowed for our work, and in part because we have inadequate information on the economics of some sectors.

Specifically, we considered the economic circumstances and incentives of:

- RIRRC
- Individual waste generators
- Municipalities
- Commercial waste generators
- Haulers

The economic tools available to adjust incentives to reduce/recycle include: tipping fees, subsidies, fines for violations, grants for specific programs, market development for recyclables end markets  user fees (e.g. Pay As You Throw).

Economic incentives for the various sectors:

RIRRC

In the short term, the RIRRC management has a direct economic **dis**-incentive to increase source reduction or recycling, because success in either area would decrease revenues from landfilling. The net revenue for the MRF operation in FY '01 was \$10.50/T, but preliminary figures for FY '02 show net MRF revenues at \$0.67/T – essentially break-even. Every ton recycled and therefore not landfilled reduces revenue by \$32 (for municipal waste) or \$50 (commercial and over-cap municipal waste). We are not able to give a net revenue estimate at this time, because we do yet have a full breakdown of operating costs. Note however, that a significant percentage of operating costs are fixed, and would not be reduced by a reduction in the amount of waste landfilled.

Contrary to this short-run view, if a longer-term approach were taken by RIRRC as an institution, there would be an incentive to extend the life of in-state landfill disposal capacity by diverting waste from the landfill, when economically feasible. When the disposal capacity at Central Landfill is fully depleted, Rhode Islanders will have to rely on out of state disposal options or site a new landfill in a different in-state location – a politically difficult task. Without a disposal facility such as the landfill, RIRRC will not be able to provide a service to municipalities and businesses that cannot be provided by private sector waste management firms. Therefore, the RIRRC would no longer have reason, or a source of revenue, to exist. We note that in four of the past five fiscal years, excess revenues have been taken from RIRRC to subsidize the General Fund. We are concerned that an expectation that these funds will be available every year may allow short-term expediencies to overshadow the need to provide cost-effective waste disposal options 20 years down the road.

Individuals

Residents of Rhode Island municipalities that fund solid waste collection and disposal through property taxes (a majority of our cities and towns) have no direct economic incentive to recycle. There is ample evidence that when individuals are charged a fee based on the amount of waste they discard, the percentage of waste that is recycled is dramatically higher. This type of user fee is popularly designated as Pay As You Throw (PAYT). This strategy to obtain a higher rate of resident compliance with municipal recycling requirements will be discussed under municipal incentives.

Municipalities

The RIRRC is nearing completion of a survey of municipalities which, among other things, has collected data on their costs of collection and disposal of trash (landfilled waste) and of recyclables for fiscal 2002. Both unit costs vary widely between municipalities, we assume because of differing population densities, different distances from the Central Landfill, and different bargains struck with haulers. For the 22 municipalities for which survey data were available to us, the range of collection and hauling costs for trash per ton are:

Towns	Trash/T in \$	Recycle/T in \$	over or (under) cap
Barrington	34	72	(1,651)
Burrillville	65	214	(503)
Central Falls	47	188	(651)
Coventry	29	51	(530)
Cranston	52	101	(1,194)
Cumberland East	37	78	1,758
Providence	45	143	(2,295)
Exeter	15	26	(1,170)
Foster	62	143	(195)
Lincoln	31	55	(1,020)
Newport North	83	154	(4,248)
Providence North	46	128	1,237
Smithfield	58	125	168
Pawtucket	33	92	(3,884)
<i>Richmond</i>	6	38	(1,788)
Scituate	59	83	(498)
Smithfield	68	153	(1,850)
Tiverton	29	159	3,000
Warren	32	104	651
Warwick	87	67	(6,838)
<i>Westerly/ Hopkinton</i>	48	252	17,023
West Warwick	56	55	(2,172)

(Italicized municipalities have transfer stations/drop off.)

At the currently legislated municipal tip fee of \$32/T, any community that is under its cap has a financial incentive to increase its rate of recycling *only* if the difference in the cost/T of collecting and hauling recyclables and of trash is less than \$32/T tip fee. Note that this is the case only for Coventry, Exeter, Lincoln, Scituate and West Warwick. Alone among the municipalities, Warwick appears to have a *lower* cost for collecting and hauling recyclables than for trash – thus Warwick has a \$52/T incentive to increase recycling. Towns over their cap (**bolded** in the right column) – have a \$50/T incentive to increase recycling, up to the point their cap is reached. For the towns for which we have data that are over their cap, only Cumberland could reduce its costs by increased recycling.

In this analysis, we have had to assume that cost/ton stays constant as volume changes, which certainly is not correct. A more sophisticated analysis would surely show some discontinuities as the change in volume collected required either adding or dropping a truck from the collection route. This type of analysis would need to be done municipality by municipality, using information particular to each. Obviously, that refined level of modeling is well beyond our current scope. Preliminary modeling shows that even at a \$32/T tip fee for trash and no tip fee for recyclables, as the rate of recycling increased, economies of scale begin to bring recycling costs into line with costs of trash disposal.

Commercial Waste Generators and Commercial Haulers

We did not have a representative of a commercial waste generator (which, in this context, means an entity other than an individual household or a public institution). Our members representing commercial haulers have not attended the meetings in which this report was planned. We invited Carole Bell, who has worked with commercial clients, to give us her perspective on financial incentives faced by commercial generators and haulers, and received the following:

1. The solid waste hauling industry has no economic incentive to support waste reduction or encourage/facilitate recycling. They have every reason to discourage any activity that decreases waste disposal, which is what they do.
2. Commercial generators have economic incentives but are either unaware of them, don't think they are significant, or cannot realize them because they are dependent on the services of the haulers.
3. A resource management approach that provides incentives for the haulers and helps generators craft cooperative hauling contracts that

support reduction may be the answer, but it will require a quantum leap in planning and cooperation and thus may take quite some time to implement.

4. More immediate benefits may come from working with the largest generators, property management companies and landlords who may respond to tax or other incentives to participate in some pilot programs to evaluate the potential waste diversion/cost benefit that could be gained from maximizing recycling. Unfortunately, the numbers may not be large enough to facilitate change. Macy's department stores management once told me that the annual savings I predicted for them was less than one day's revenue and they couldn't justify implementing a waste reduction program for such "small potatoes."

5. Enforcing the existing commercial recycling regulations is a straightforward approach.

Summary of Incentives: The composite of these analyses of current economic incentives is that *none of the sectors involved with solid waste has an effective financial incentive to increase recycling rates or to reduce waste generation.* Thus we should not be surprised that the amount of waste landfilled in 2002 was 50% higher than was projected in the 1996 comprehensive plan (1,047,697 tons actual, compared to 659,840 projected). **Therefore, we find that current economic incentives are inconsistent with the legislated goal to reduce and recycle solid waste in preference to landfilling.**

Interim Recommendations

The Sub-Committee will continue its work after this report, and all recommendations offered at this time are preliminary. Many of these recommendations have significant overlap with other committees, and we stand ready to work cooperatively in the design of effective economic incentives that are compatible with the work of these committees.

Recommendation for Individual Incentives

In principle, economic incentives for individual households are obvious and straightforward – i.e. connect the amount an individual pays to the amount of trash to be disposed, popularly called Pay As You Throw (PAYT). The PAYT strategy has been extensively tested nationwide and results are available at: <http://www.epa.gov/epaoswer/non-hw/payt/> In Massachusetts, where tip fees average over \$70/T (according to the MA DEP), over 100 of their 150 municipalities have adopted PAYT systems. The Sub-Committee finds that PAYT is the **only** strategy that is likely to increase significantly the separation of recyclables and source reduction by individual households.

Rhode Island municipalities, with a much lower tip fee, have generally been unwilling to face the perceived political challenges or the startup costs of implementing a PAYT program. At the present, only five Rhode Island municipalities have PAYT systems, and none of these have curbside collection. (These communities using transfer station/drop off are North Kingstown, South Kingstown/Narragansett, Westerly, Richmond and New Shoreham.) Municipal officials fear that their residents will see PAYT as a new tax – as being asked to pay for a service for which they already pay through property taxes. In a time of perpetually increasing municipal costs, it is unlikely that instituting a PAYT system will ever lead to an actual reduction in property tax rates.

The Sub-Committee believes that resident resistance to PAYT would be lower when a community faces a dramatic increase in the tax rate, and municipal officials can assert that without PAYT implementation the rate increase would be even more dramatic. More specifically, if the need for a property tax increase is a result of a renegotiation of a waste management contract that results in a sharply increased cost, PAYT can be logically connected to the need for additional funds. The fairness argument – that those who impose the greatest cost on the community by discard of large amounts of trash should pay a higher cost than those who manage their waste more responsibly – may be particularly persuasive at such times.

If political apprehensions on the part of local officials can be overcome, there will still be a need for startup funds for the initiation of a PAYT program. ***The Sub-Committee recommends that RIRRC should provide adequate financial, technical and in-kind support for municipalities seeking to implement PAYT programs.*** The nature of the financial support should be sufficient to offset reasonable start-up costs, similar to what was provided to municipalities when the first recycling programs were initiated in the early 1990's and again in recent years when communities moved to "maximum" recycling. At those time RIRRC provided supplemental funding for coordinators, vehicles, and/or additional collection costs. The level of financial support should be calculated on a per-household basis and should defray the initial start-up costs incurred by municipalities electing to implement PAYT.

A detailed proposal for the implementation of RIRRC startup funding for a PAYT program is attached as Appendix A. Appendix B provides an illustration of how PAYT has worked in three cities in Massachusetts.

Recommendations for Financial Incentives for Municipalities

Rhode Island tip fees for municipal waste are *far* lower than in adjoining states, and an obvious incentive for increased municipal support for recycling, including diversion of yard waste for the trash stream, would be an increase in the municipal tip fee. In Massachusetts, tip fees average \$71 and in Connecticut they are in the \$51-61 range. However, the RIRRC enabling legislation makes clear that the disposal of municipal waste should be done economically, and so far the Sub-Committee has not seen fixed and marginal cost data on disposal that establishes that \$32/T does not cover the real cost of disposal. Also, the municipal tip fee is set by the General Assembly, and may not be easily adjusted. The Sub-Committee has no recommendation on the appropriate level for the municipal tip fee at this time.

Reconciling the Municipal Cap with Recycling Goals – Unlike the municipal tipping fee, which is set by the General Assembly, the RIRRC, under RIGL §23-19-13 (g)(3), has broad discretion to set a cap on the amount of waste a municipality can dispose at the municipal rate. The commercial fee (currently \$50/T) is charged for municipal waste above the cap. The current caps are set by population and statewide waste generation rates, and then reduced by a factor to account for reduction by recycling – currently a reduction of 15%.

- ***The Sub-Committee recommends that the municipal caps should be made consistent with recommendations in the revised Comprehensive Plan for source reduction. (We anticipate that the revised Plan will project a decreasing waste/capita ratio, as did the 1996 Plan.)***
- ***We also recommend that the recycling reduction in the cap be made consistent with the municipal recycling rate that will be projected in the revised Comprehensive Plan, in order to provide an incentive for municipalities to increase their rate of recycling and yard waste diversion.***

At current commercial rates, for municipalities that are above their caps, this will provide an additional incentive of \$18/T to encourage recycling. It will also improve the internal consistency of the Plan.

Recall however, that for most communities the cost of collecting and transporting recyclables is higher/ton than for trash – on average for the municipalities for which we have data, that difference is \$58/T. Seven of these municipalities already have a small financial incentive to increase recycling, because their recycling costs are equal to or less than \$32 difference from their trash costs. Of the municipalities over their cap, only Cumberland could reduce costs by increased recycling.

One way to increase the recycling incentive for municipalities that are under their cap might be to allow them to market their under-cap amounts to municipalities that are over cap. Thus, after (but *only* after) municipal caps are adjusted for consistency with the recycling rates projected by the revised Plan, municipalities that are able to achieve a higher diversion rate could market their remaining undercap amount for a sum equal to or less than the difference between the municipal and the commercial tip fee to a community that was not able to stay under their cap. An example of such a trading system can be found in Appendix C. Note however, that a tradable permit scheme will still not provide a positive economic incentive for a majority of communities because their difference between recycling and trash disposal costs is greater than \$50. We understand that the RIRRC is considering increasing the recycling reduction in the municipal cap to 20%. Appendix D shows the effect of this change on the potential for marketable permits. [Note that if a trading system is put into place *before* the recycling reduction is increased, municipalities currently under their caps could simply sell their credits, without increasing their recycling, and purchasing communities that are over cap would have a reduced incentive to recycle. Also, the under-cap tonnage currently is higher than the over-cap, which means the market in credits wouldn't clear.]

Municipal Participation Grant - A municipal subsidy tied to recycling rates could be provided to help offset the generally higher cost of collecting and transporting recyclables. Beginning in FY 1996, RIRRC initiated the Municipal Recycling Participation Grant Program. Municipalities participating in the Maximum Recycling Program received an annual grant based on the tonnage of recyclable material delivered to the RIRRC MRF, from a total grant pool of \$300,000 in FY 2002. (See Appendix E). The grants received by the municipalities are proportional to the total amount of recyclable material delivered in that fiscal year – which generated a subsidy rate of just over \$4/T.

This program was eliminated in the FY 2003 RIRRC budget; ostensibly due to the revenue forgone by RIRRC not receiving the statutorily slated municipal tip fee increase of approximately \$1.30/ton. The preliminary Recycling Program budget for FY 2004 includes \$400,000 to continue this program, however, its continuation is contingent on approval by the RIRRC Executive Director and Board of Commissioners Finance Subcommittee.

While subsidies in the range of \$4 – 5 /T help to offset the higher cost of municipal recycling, obviously they provide an inadequate incentive when compared to the average difference between these costs of \$26/T (difference in trash and recycle collection and hauling, partially offset by the tip fee). At the current recycling rates, a subsidy to communities of approx. \$1.5M would be required to bring recycling costs in line with waste disposal costs, and a higher subsidy would be needed to give a positive economic incentive to increase recycling rates. The Sub-Committee has not yet decided on the level of recycling subsidy to recommend. An alternative might be, after municipal caps are adjusted, to base subsidies on the amount under-cap – to provide an incentive for source reduction and home composting efforts by municipalities.

Recommendations for Commercial Generators

For the short-term, the Sub-Committee recommends that current commercial recycling regulations be enforced. DEM regulations (Regulation #12-070-003) require that commercial solid waste to be landfilled not contain more than 20% recyclables by weight. Enforcement was difficult at the time these regulations were adopted, because trucks were dumping directly at the tip face. Now that trucks dump at the tipping facility and some recyclables are already being removed, enforcement should be more feasible. We are told that a few attempts to enforce in the past also met with evidentiary problems.

- ***The Sub-Committee recommends that the RIRRC and DEM work together to resolve these enforcement issues, to provide commercial generators and haulers with an immediate economic incentive to divert recyclables from the commercial waste stream.***

The current DEM regulations for reduction and recycling of commercial solid waste require that generators separate recyclables from their wastestream, and submit annual reports to demonstrate that they have done so. These regulations also could be enforced, although the current state of the DEM budget would require funding, presumably from RIRRC excess revenues (*vide infra*).

The sub-committee agreed that the commercial tip fees should be set at but no higher than the costs of out-of-state disposal of commercial waste. At the present time, the lowest out-of-state price appears to be disposal via rail transport in a Georgia landfill, for a cost of \$55/T, (See Appendix F) which is roughly in line with the current commercial rate. [One of the members of our committee believes that this cost can be reduced to close to \$50/T.]

We are told that another sub-committee is investigating resource management approaches that provides incentives for the haulers and helps generators craft cooperative hauling contracts that support reduction. Consequently our sub-committee has not investigated this option.

Recommendations for the RIRRC

As we said earlier, the RIRRC faces strong *short-term* financial **dis**-incentives to reduce the amount of waste that is landfilled, since tip fees are the major source of RIRRC revenues. Because the RIRRC is a non-profit corporation, it is challenging to craft economic incentives that would offset the existing short-term dis-incentives. We have therefore relied on recommendations that provide economic incentives for the other sectors, many of which will require RIRRC funding. We will attempt to estimate longer-term financial incentives that will result from prolonging the useful life of the current and projected landfill space at the Central Landfill, and thus delay expenditures and the political costs of creation of new landfill space. Landfill space is a depletable asset with real financial value, and economic analysis of solid waste management need to take this into account.

Funding Our Recommendations

Several of the Sub-Committee's recommendations would require funds not currently budgeted by the RIRRC. There appears to be a ready and obvious

sources of these funds in the operating surplus the RIRRC has run in the recent past. For fiscal years '98, '99, '01 and '02, the amount turned back to the general fund has averaged approximately \$3M. Funds at this level are more than adequate to cover the additional expenditures proposed here. We note, however, that if PAYT and enforcement of commercial recycling regulations are successful in achieving significant reductions in the amount of waste landfilled, the RIRRC operating surplus also is likely to be reduced.

Economics of Conserving Landfill Capacity

A major task that the Sub-Committee has contemplated but not yet completed is the estimation of the present value of landfill space. The simplest approach to setting this value is to use the cost of disposal out-of-state, which currently is \$55 (Appendix F). (One member of the committee believes that this cost can be reduced to closer to \$50/T.) Currently, long-term contracts are available for this landfill, but of course changed circumstances of these private operators (e.g. financial insolvency) or changes in state-level regulation could make this option less available. Such issues as the long-term reliability of out-of-state disposal and whether as a matter of environmental responsibility, Rhode Island should manage its own waste may lead us to conclude that Rhode Island should continue to have available landfill capacity. To prepare for this contingency, we need to calculate the present values (both direct and external) of extending the life of the existing landfill and of delaying the need to create new landfill capacity. This latter task is sufficiently challenging that it has not yet been completed. We will address it in our final Sub-Committee report.

Appendices

Appendix A

Financial Assistance from RIRRC for PAYT Program Start-up Costs

There have been discussions between RIRRC staff and officials from three municipalities exploring the possibility of implementing Pay-As-You-Throw (PAYT) in the past year. At each of these meetings, the issue of financial assistance to defray start-up costs was raised by the municipal representatives.

The provision of funding for municipalities implementing PAYT programs will be essential to their utilization in Rhode Island. Using the Massachusetts experience as a guide, it is reasonable to assume that initiating a successful new PAYT program will require an initial investment commensurate with the size of the municipality and the type of solid waste collection program that is in place.

The Massachusetts Department of Environmental Protection (DEP) has provided significant financial support for municipalities to encourage them to implement PAYT programs. Massachusetts DEP provides grants and other assistance to municipalities. This includes:

- Municipalities with curbside trash collection can apply for a PAYT grant of up to \$10 per household for units served, with a cap of \$130,000.
- Municipalities with drop-off trash programs can apply for a grant of up to \$5 per household for units served.
- Municipalities can also apply for customized consumer education materials – a PAYT brochure or post card for a new program. The Massachusetts DEP also provides technical assistance, public meetings, workshops and presentations to residents, elected and municipal officials.

Although RI DEM has done some fine work in the past on promoting PAYT, given the agency's current budget situation it is improbable that the agency would be able to provide funding for municipalities seeking to implement PAYT programs. Therefore, the logical source of potential funding for initiation of PAYT programs is RIRRC.

Appendix B Massachusetts PAYT Case Studies

Community: Brockton, MA

Population: 95,994
of Households: 25,407
Program Type: Can/Bag
Commencement: 2001

The City of Brockton Massachusetts found itself in a potential financial crisis as their ten-year contract with Waste Management (WM) was coming to an end. The contract for approximately 4 million dollars would have doubled if the practice of unlimited trash and “disincentivized” recycling were to continue.

Prior to a Pay As You Throw (PAYT) program being implemented, the City of Brockton, offered its residents unlimited curbside pick-up of trash. In addition to that, bi-weekly yard waste pick-up and bulky item or white goods pick-up by appointment was offered.

A Request For Proposal (RFP) was sent out nationally; Brockton put its PAYT requirements, including large-scale experience, within the RFP. There were only three bidders and the lowest bidder, Browning Ferris Industries (BFI), won the contract. BFI began service on July 1st, 2001 and the PAYT program began October 1st, 2001.

Brockton has a combination can/bag program, a two-tiered pricing system, and a combination of a subscription and prepaid billing system. Each household must use only ONE 32 gallon barrel and must not exceed 50 pounds. Any additional trash must be placed in a special “Brockton Bag”. The bags are available at local retailers, City Hall, and the Recycle Depot. Each bag costs \$1 and is sold in packages of 5. BFI, by contract agreement, is responsible for the manufacturing, distributing, and retailing of the “Brockton Bag”. The City receives \$0.25 for each bag sold and, in addition to that, there is no tax on the bags. In addition to the prepaid pricing, Brockton has a flat-rate of \$220 per year that is billed bi-monthly as part of the water/sewer/refuse bill. This fee has not changed in amount since PAYT, only in collection process. Prior to PAYT, \$110 was collected within property taxes and \$110 within the water/sewer/refuse bill. Now, \$220 pays for collection of ONE 32 gallon barrel, recycling, bulky item pick-up, white goods pick-up by appointment, weekly seasonal yard-waste pick-up, household hazardous waste disposal, and a Recycling Depot drop-off program. Again, any additional trash costs \$1 per 33-gallon bag.

The public was informed of the PAYT program using the following methods: newspaper, local radio station, local cable (30 second commercials), interior and exterior of local buses, insert into the water/sewer/refuse bill, and flyers. Brockton also adapted a slogan "Fareway" along with an animated trashcan, providing a much friendlier impression of the PAYT program. Massachusetts Department of Environmental Protection (DEP) granted the City of Brockton 2 recycling bins per household and PAYT flyers, prepared and distributed.

Prior to the pick-up on October 1st, 2001, the first day of PAYT, teams were sent out to monitor compliance. Surprisingly, there was a 92% compliance rate. Households were given a six-month grace period and until then were still being informed with flyers, stickers, and notices. After that six-month grace period, currently, if a household continued to resist, a tag is placed on the container that does not comply indicating the issue. The hauler makes a list of all non-compliant households and faxes it in to City Hall at the end of the day. The following day, the refuse foreman goes out to each non-compliance household; if the issue has not been resolved (removed from the curb) a picture is taken for evidence and the household owner is sent a courtesy letter indicating the problem. That is considered the first offense. For the second offense, a \$100 fine is issued and there is an option to either pay the fine or appear in court. For each succeeding offense, up to 5, a \$300 fine is levied. After 5 offenses trash service may be revoked.

Residents are not required to participate in the City of Brockton's PAYT program. They must show proof of other service and they will not be charged the flat fee. However, WM and BFI both charge \$360 per year for curbside pick-up and that does NOT include other services such as recycling, bulky item, yard waste etc. As a result of PAYT, the trash truck routes have dropped from 9 to 7 and 2 recycling trucks have been added, for a total of 5. The previously rising solid waste tonnage has gone down almost 9,000 tons and yard waste, for example, has increased by approximately 2,600 tons. In a year, about 500,000 "Brockton Bags" were sold. Rarely, anymore, is trash stacked from telephone pole to telephone pole. Brockton City officials have been extremely pleased with the success of their program.

Effectiveness of Brockton PAYT:

Mixed Recyclables	Increase	215%
Paper Recyclables	Increase	108%
Solid Waste	(Decrease)	(18%)
No. Of Recycling trucks	Increase	3 to 5
No. Of Trash Trucks	(Decrease)	9 to 7

Seekonk MA

The Town of Seekonk's landfill reached its capacity 4-5 years early. A Pay As You Throw Program (PAYT) was implemented almost immediately. With about 3 months to inform residents and set up haulers in 1993, waste management and disposal has continued to be covered 100% by PAYT and residential fee.

The Town of Seekonk, prior to PAYT, offered curbside pick-up and drop-off programs; required tied/closed bags; no recycling; and only a drop-off yard waste program. Solid waste management and disposal were previously charged within resident property taxes.

Seekonk, currently, has each household pay a fee of \$98. In addition, all trash must be in a special "Seekonk Bag", which are available in local stores, 10 bags per package, and two different sizes. The small bag is a 12-gallon bag sold for \$0.50 and the large bag is a 30-gallon bag sold for \$0.86. The fee covers the fixed or contracted cost of the program and the small and large bag fee covers the cost to make the bags and the disposal/tipping fee.

Households may also purchase a sticker for curbside collection of bulky items: \$4 for non-appliances such as tires and furniture and \$10 for appliances. Seasonal curbside yard waste pick-up is also available.

Additional drop-off programs include: recycling and yard waste; oil, batteries and anti-freeze; paint and paint products; fluorescent light bulbs; and mercury containing items. Seekonk Board of Health sponsors a household hazardous waste collection day. The Town of Seekonk has achieved a 44% recycling rate for fiscal year 2002.

Worcester MA

The City of Worcester faced a significant budget cut in 1992. The Pay As You Throw (PAYT) program was established, in turn, because the City did not have the money to continue to provide collection and disposal of household trash.

In order to inform residents of Worcester of the PAYT program, they hired an advertising consultant and provided a budget of \$50,000. The following marketing methods were used: flyers printed in English, Spanish, Vietnamese, and Portuguese; billboards, plane pulling banner at major event, many newspaper articles due to the controversy; and bumper stickers.

Worcester hired its own curbside trash hauler and contract out the curbside recycling. All trash must be in a special “Worcester Bag”, which are available in two sizes: \$0.50 per 15-gallon bag and \$1 per 30-gallon bag. The bags are sold at 101 different Worcester retailers.

To ensure compliance, Worcester hired four people to act as trash police. The City’s haulers do not pick up trash that is not in a “Worcester Bag”. The trash police goes out the next day, if the trash has not been removed from the curb a bright sticker is placed on the bag or container, indicating the problem. The household then has an additional 24 hours to remove the trash from the curb, and if not, the trash will be removed by the City and a citation will be issued to the violator.

Appendix C

One way to increase recycling incentives for municipalities that are under their cap would be to allow them to market their under-cap amounts as credits to municipalities that are over cap. Municipalities that are able to achieve a higher diversion rate could market their remaining under-cap amount for a sum equal to or less than the difference between the municipal and the commercial tip fee, to a community that was not able to stay under their cap.

The table below illustrates this concept for three communities in Rhode Island. The Base case values are real values collected by the RIRRC survey. The percentage increases described in the first column are increases in recycling assumed *over* the Base case recycling rate and are represented as percentage increases in the third column (% Recycled).

The value of each credit is assumed as \$15/T.

	Total Cost of Collection & Disposal	% Recycled	Savings / (Cost) from increased recycling	Amount (under) / over cap	Income / (Expense) from trade	Net Savings / (Cost)
Cranston (Base case)	3,528,461	18%	0	(1,194)	17,907	17,907
5% increase	3,534,877	19%	(6,416)	(1,562)	23,432	17,016
10% increase	3,541,293	20%	(12,832)	(1,930)	28,957	16,125
15% increase	3,547,709	21%	(19,248)	(2,299)	34,482	15,234
20% increase	3,554,125	22%	(25,663)	(2,667)	40,007	14,344
30% increase	3,566,956	24%	(38,495)	(3,404)	51,057	12,562
40% increase	3,579,788	25%	(51,327)	(4,141)	62,108	10,781
East Providence (Base case)	2,100,000	19%	0	(2,295)	34,425	34,425
5% increase	2,115,229	20%	(15,229)	(2,523)	37,838	22,608
10% increase	2,130,458	21%	(30,458)	(2,750)	41,250	10,792
15% increase	2,145,687	22%	(45,687)	(2,978)	44,663	(1,025)
20% increase	2,160,916	23%	(60,916)	(3,205)	48,075	(12,841)
30% increase	2,191,374	25%	(91,374)	(3,660)	54,900	(36,474)
40% increase	2,221,832	27%	(121,832)	(4,115)	61,725	(60,107)
North Smithfield (Base case)	571,000	22%	0	168	(2,514)	(2,514)
5% increase	573,300	23%	(2,300)	103	(1,541)	(3,841)
10% increase	575,600	24%	(4,600)	38	(569)	(5,169)

15% increase	577,900	25%	(6,900)	(27)	404	(6,496)
20% increase	580,200	27%	(9,200)	(92)	1,377	(7,824)
30% increase	584,800	29%	(13,800)	(221)	3,322	(10,479)
40% increase	589,401	31%	(18,401)	(351)	5,267	(13,133)

Note that, given the \$32/T tip fee, a tradable permit scheme will not provide a positive economic incentive for a majority of communities because their difference between recycling and trash disposal costs is greater than \$50.

Appendix D

Using the example of the communities in Appendix C, an increase in the recycling reduction in the municipal cap to 20% will impact the potential for marketable permits as follows:

	Amount (under) / over cap (15% reduction)	Income / (Expense) from trade	Net Savings / (Cost)	Amount (under) / over cap (20% reduction)	Income / (Expense) from trade	Net Savings / (Cost)
Cranston (Base case)	(1,194)	17,907	17,907	840	(12,603)	(12,603)
5% increase	(1,562)	23,432	17,016	472	(7,078)	(13,494)
10% increase	(1,930)	28,957	16,125	104	(1,553)	(14,385)
15% increase	(2,299)	34,482	15,234	(265)	3,972	(15,276)
20% increase	(2,667)	40,007	14,344	(633)	9,497	(16,166)
30% increase	(3,404)	51,057	12,562	(1,370)	20,547	(17,948)
40% increase	(4,141)	62,108	10,781	(2,107)	31,598	(19,729)
East Providence (Base case)	(2,295)	34,425	34,425	(1,036)	15,540	15,540
5% increase	(2,523)	37,838	22,608	(1,264)	18,953	3,723
10% increase	(2,750)	41,250	10,792	(1,491)	22,365	(8,093)
15% increase	(2,978)	44,663	(1,025)	(1,719)	25,778	(19,910)
20% increase	(3,205)	48,075	(12,841)	(1,946)	29,190	(31,726)
30% increase	(3,660)	54,900	(36,474)	(2,401)	36,015	(55,359)
40% increase	(4,115)	61,725	(60,107)	(2,856)	42,840	(78,992)
North Smithfield (Base case)	168	(2,514)	(2,514)	426	(6,384)	(6,384)
5% increase	103	(1,541)	(3,841)	361	(5,411)	(7,711)
10% increase	38	(569)	(5,169)	296	(4,439)	(9,039)
15% increase	(27)	404	(6,496)	231	(3,466)	(10,366)
20% increase	(92)	1,377	(7,824)	166	(2,493)	(11,694)
30% increase	(221)	3,322	(10,479)	37	(548)	(14,349)
40% increase	(351)	5,267	(13,133)	(93)	1,397	(17,003)

Appendix E

RIRRC FY 2002 Municipal Recycling Participation Grants

Total Grant Funding Budget: \$300,000
Tons for calculation (FY 2001): 72,280.32

	Municipality	Signed contract	Tons to MRF	Grant Amount
1	Barrington	Yes	2,374.63	\$ 9,721.36
2	Bristol	Yes	1,306.93	\$ 5,350.36
3	Burrillville	Yes	1,410.03	\$ 5,772.44
4	Central Falls	Yes	733.61	\$ 3,003.28
5	Charlestown	Yes	441.59	\$ 1,807.80
6	Coventry	Yes	2,446.81	\$ 10,016.85
7	Cranston	Yes	7,304.81	\$ 29,904.73
8	Cumberland	Yes	3,020.61	\$ 12,365.90
9	East Greenwich	Yes	1,556.41	\$ 6,371.69
10	East Providence	Yes	4,176.01	\$ 17,095.92
11	Exeter	Yes	580.31	\$ 2,375.70
12	Foster	Yes	407.42	\$ 1,667.91
13	Glocester	Yes	583.15	\$ 2,387.32
14	Jamestown	Yes	815.72	\$ 3,339.43
15	Johnston	N/A	2,310.93	\$ 9,460.58
16	Lincoln	Yes	1,558.01	\$ 6,378.24
17	Little Compton	Yes	123.53	\$ 505.71
18	Middletown	Yes	422.50	\$ 1,729.65
19	Newport	Yes	2,309.82	\$ 9,456.04
20	North Kingstown	Yes	3,346.64	\$ 13,700.61
21	North Providence	Yes	2,602.68	\$ 10,654.96
22	North Smithfield	Yes	1,132.15	\$ 4,634.84
23	Pawtucket	Yes	3,965.47	\$ 16,234.00
24	Portsmouth	Yes	758.59	\$ 3,105.55
25	Providence	Yes	6,422.49	\$ 26,292.65
26	Richmond	Yes	196.61	\$ 804.89
27	Scituate	Yes	1,123.18	\$ 4,598.12
28	Smithfield	Yes	1,866.97	\$ 7,643.08
29	Warren	Yes	769.54	\$ 3,150.37
30	Warwick	Yes	10,047.37	\$ 41,132.33
31	West Greenwich	Yes	224.87	\$ 920.58
32	West Warwick	Yes	2,144.78	\$ 8,780.39
33/34	Westerly/ Hopkinton*	Yes	3,173.09	\$ 12,990.12
35	Woonsocket	Yes	1,623.56	\$ 6,646.60
Total Grant Amount				\$ 300,000.00
36	Tiverton	No	964.18	
37	Narragansett	No	N/A	
38	New Shoreham	No	N/A	
39	South Kingstown	No	663.27	

* Westerly and Hopkinton participate jointly.

Individual calculations are based on the ratio of each municipality's tonnage to the total tonnage of material delivered to the MRF (by eligible municipalities) multiplied by the total amount of grant funds available.

Appendix F

Price Structure for Rail Hauling Solid Waste from Rhode Island to the Charing, Georgia Landfill

March, 28, 2003

Base Assumptions	Estimates
Working Days per Year, Assuming a 5-Day Work Week	260 Days
Total Tons Shipped Annually	150,000 Tons
Tons Shipped Daily	577 Tons
Landfill Disposal Cost at Charing, Ga.	\$7.50/Ton
CSX Transport Cost/Rail Car/Trip, Worcester -- Charing, Ga	\$3,169.00/Car
P&W Transport Cost/Rail Car/Trip , Providence -- Worcester	\$400.00/Car
Tons per Rail Car per Trip, Assuming 4 Containers/Car	92 Tons/Car
Rail Transportation/Ton	\$38.79
Purchase Cost per Rail Car, High Estimate	\$60,000
Useful Life of Rail Car	12 years
Monthly Cost	\$416.67
Rail Car Cycle Time	22 days
Rail Car Trips Annually	16.59 Trips/Year
Containers per Rail Car	4 Containers
Tons per Rail Car per Trip	92 Tons
Total Rail Cars Needed to Ship ~577 Tons per Day	99 Rail Cars
Total Rail Car Capital Outlay	\$5,940,000
Rail Car Fixed Cost/Ton	\$3.30/Ton
Land, Rail Head & Related Improvements - Cost	\$300,000
Land, Rail Head & Related Improvements -- Life	20 years
Equipment (includes container handler & flat bed truck--Cost	\$1,000,000
Equipment Life	7 Years
Fixed Rail Head & Equipment Costs	\$1.05/Ton
Loading Cost/Year	\$250,000/Year
Loading Cost	\$1.67/Ton

Cost per Container	\$5,000/Container
Container Cycle Time	22 Days
Working Days per Cycle	16 Days
Container Life	5 Years
Tons per Container	23 Tons
Containers Needed per Working Day	25 Containers
Total Containers Needed	394 Containers
Total Container Capital Cost	\$1,970,855
Container Cost per Ton Shipped	\$2.63/Ton
TOTAL COST PER TON SHIPPED	
	\$54.94/TON