

Fee Options to Support Integrated Waste Management

**Analysis of Emerging Market Development Options
Report #3**

DRAFT

**Prepared by: Planning and Analysis Office
California Integrated Waste Management Board
July 1994**

NOTE: Legislation (SB 63, Strickland, Chapter 21, Statutes of 2009) signed into law by Gov. Arnold Schwarzenegger eliminated the California Integrated Waste Management Board (CIWMB) and its six-member governing board effective Dec. 31, 2009.

CIWMB programs and oversight responsibilities were retained and reorganized effective Jan. 1, 2010, and merged with the beverage container recycling program previously managed by the California Department of Conservation.

The new entity is known as the Department of Resources Recycling and Recovery (CalRecycle) and is part of the California Natural Resources Agency.

This document was originally printed in hard-copy format and was declared out of print when all known copies had been distributed. A complete version of the report was located in 2011 and was scanned to a digital format, making it available for downloading.

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FORWARD

Fee Options to Support Integrated Waste Management is one of five reports prepared in Connection with the Board's Analysis of Emerging Market Development Options. As outlined in **Meeting the Challenge: A Market Development Plan for California**, the analysis was undertaken to better understand the policy options and issues concerning postconsumer materials market development in California.

Four Additional Board reports were prepared by staff as part of this project:

- Report #1** **Summary Report on Emerging Market Development Options** summarizes the findings from reports #2 through #5.
- Report #2** **Manufacturer Responsibility Options to Support Integrated Waste Management**, identifies and evaluates manufacturer responsibility policies including recycled content and other product specific mandates, utilization rates, and industry funding organizations.
- Report #4** **Tradable Credit Applications to Integrated Waste Management**, examines the criteria for a successful tradable credit policy and the applicability of tradable credits to manufacturer responsibility and fee options.
- Report #5** **Emerging Issues: Global Agreements**, analyzes the impact of manufacturer responsibility and fee policies on trade agreements.

These reports are available by contacting the Board at (916) 255-2195.

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I INTRODUCTION

BACKGROUND

Fee Options to Support Integrated Waste Management is one of five California Integrated Waste Management Board (Board) reports that analyze emerging market development options. The analysis was called for in **Meeting the Challenge: A Market Development Plan for California**, adopted by the Board in March 1993. The term "emerging market development options" was coined to describe all fee and manufacturer responsibility policy options that support secondary materials market development. These policy options were determined to require additional analysis prior to Board consideration, so their potential market development impact could be more fully understood.

This report is based on extensive background research, which is summarized in Appendix A. Addressed within this report are policy options to establish fee systems that support secondary materials market development, an integral component to an integrated waste management (IWM) program. In a broad sense, a fee requires individuals to pay money based on their use of a service, participation in an activity, or consumption of a product. Fees can be differentiated using many criteria including the fee goal, what the fee is levied on, who pays the fee, and the basis for setting the fee level. These four criteria comprise a basic framework that can be used to delimit the parameters of any fee.

Six different fees that merit analysis were identified; each will be evaluated in this document. Each identified fee supports IWM and has the ability to be crafted to stimulate secondary materials market development. These six fee types include a mass minimization fee, a design characteristic fee, a deposit surcharge, an advanced disposal-recycling fee, a gross receipts fee, and unit based disposal pricing.

PROJECT GOALS

While there is a supply and a demand side to any market, it is demand for California's postconsumer materials that is of primary concern in this document. For most postconsumer materials, soft demand conditions preclude additional diversion. Despite efforts on behalf of the state, localities, the private sector, and advocates it is not clear that manufacturers will be able to absorb the quantity of postconsumer materials that localities will need to divert to comply with the IWM Act's mandate.¹ Stronger demand will be necessary to achieve the disposal reduction mandates set forth in the IWM Act of 1989 and subsequent, related legislation.

¹ See **Emerging Market Development Options Report #1** for an example of the diversion, by material type, necessary to attain a 50 percent diversion rate for all solid waste.

This document identifies and analyzes fee based policies that complement IWM goals and encourage the private sector to increase its use of postconsumer materials, thus ensuring the long run success of IWM in California. Fees are a tool historically used by government to generate revenue and influence behavior. Their application to support secondary materials market development is novel and thus requires analysis. Should a fee component be included in future legislation, Board staff can use the background analyses and evaluation criteria developed in this study to assess the desirability of pursuing the proposal. The analysis and evaluation criteria also can be used by the Board to develop its own proposal.

REPORT ORGANIZATION

Section I, Introduction, includes an overview of project background and goals.

Section II, Fee Framework, provides background information on fee systems and identifies four criteria for differentiating fees. The discussion in this section is of a general nature; analysis of specific fee frameworks occurs in Sections IV-IX.

Section III, Evaluation Criteria, describes the evaluation criteria used to assess the merits of each fee option. The criteria are intended to represent issues of key importance to the Board when evaluating specific proposals. The evaluation criteria can be used to differentiate between proposals that merit additional consideration and those that do not further California's market development or IWM goals.

Sections IV-IX provide an evaluation of each generic fee option based on the evaluation process established in Section III. The following options are addressed: a mass minimization fee, a design characteristic fee, a disposal surcharge, an advanced disposal-recycling fee, a gross receipts fee, and unit based disposal pricing.

Section X, Options Recommended for Board Consideration, identifies those fee options recommended for Board consideration. Recommendations are based on the evaluation that occurs in Sections IV-IX.

Appendix A, Background Research, provides an overview of the research performed prior to drafting this report. The following activities were performed: a literature review and a nation-wide survey of existing and proposed fee systems. In addition to a summary of results from these activities, a copy of the survey and a bibliography are also included.

Appendix B, Analysis of Potential Fee Payers, identifies all possible fee payers and, based on the activities in which they engage and the factors which motivate their behavior, recommends fee options that would encourage desired behaviors.

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II FEE FRAMEWORK

Four criteria establish a framework that can be used to differentiate various fees. These criteria are as follows: the fee goal, what the fee is levied on, who pays the fee, and the basis for setting the fee level. Each criteria is discussed below as are the variable forms the criteria can assume. The first criteria that should be delimited is the fee goal. When considering the criteria and their application to a specific fee, the reader should keep in mind that the criteria should not be delimited independently. Because one criteria is established along a specific line, it may be most logical to fix the parameters of another criteria in one way and not another. It is only after all criteria are delimited that a framework is complete and a coherent fee system has been developed.

FEE GOAL

Imposition of a fee will generate revenue and/or modify behavior. To the extent that the fee administrator wants one impact to supersede the other, the fee can be structured to reflect this goal. Historically, government, at all levels, has used fees to generate revenue to finance services it provides constituents. However, a fee's goal need not be limited to generating revenue; if crafted properly, fees can be used to effect a desired behavior.

To support market development, monies from a revenue-generating fee should be dedicated to funding market development initiatives. To realize a behavior change, the fee structure must be flexible and reward rate payers who display desired behaviors. Fees intended to modify behavior to support IWM goals can have one of four specific objectives: (1) encourage waste prevention; (2) encourage design characteristics to enhance factors such as recyclability, reuse, or durability; (3) encourage diversion; and (4) encourage postconsumer materials use.

It is unlikely that fees primarily intended to encourage waste prevention will have much impact on secondary materials markets. Theoretically, there is the possibility that the decrease in secondary materials generation associated with waste prevention could reduce secondary materials supply sufficiently to support a higher price; however, as mentioned, this is uncertain, and it may be difficult, given the large number of variables affecting material price, to attribute a change in price to waste prevention.

There is a strong possibility that a fee primarily intended to effect a desired design characteristic could impact secondary materials markets either directly or indirectly. Secondary materials demand would be stimulated if a fee based on a product or package's virgin material content were enacted. Demand for secondary materials could be indirectly affected by encouraging a design feature that would reduce contamination rates in recovered materials. This would have a beneficial impact on materials processing costs and perhaps support material price increase and/or additional market demand.

Fees that encourage material diversion must be carefully crafted, because if they are too effective (i.e., a lot of material is diverted), then markets may become saturated. If this occurs material prices will plummet and it may be difficult to sustain diversion programs. Eventually, either market demand will need to be expanded or diversion programs will become insupportable. For this reason, it is integral that a fee designed to encourage diversion either contain a market development component or be targeted a material, product, or package for which there exists sufficient untapped demand.

The fourth IWM goal that a fee can assume, encourage postconsumer material use, has a direct impact on secondary materials demand. If the fee rewards this behavior type, then manufacturers will be more likely to use postconsumer materials and consumers will be more likely to look for this attribute when making purchasing decisions.

The remaining three differentiating criteria, which are discussed below, can be developed to support any of these four specific objectives. The extent to which any specific impact will be realized is constrained by technical and economic feasibility.

WHAT IS THE FEE LEVIED ON

Once the primary goal of the fee has been resolved, a narrow range of what the fee should be levied on often falls out naturally. The following table, Table II-1, links the identified IWM fee goals to the differentiating criterion that will be discussed in this subsection.

TABLE II-1	
FEE GOAL	WHAT IS THE FEE LEVIED ON
Generate Revenue	raw material, package, or product using any basis or disposed waste
Encourage Waste Prevention	weight or volume of a package, product, or raw material or disposed waste
Encourage Specific Design Characteristics	products or packages that do not exhibit desired design characteristic
Encourage Waste Diversion	products, packages, or disposed waste
Encourage Postconsumer Materials Use	virgin materials use

All goals, with the exception of generate revenue, lend themselves to a fee placed on a material, package, or product, based on a specific attribute that is correlated directly to the goal. For example, if the goal is to reduce the amount of material

going to landfills vis à vis waste prevention, the fee targets material, package, or product weight or volume. An IWM fee with the primary goal to generate revenue has a broad range of attributes across which the fee can be assessed. Because in this case behavior modification is deemed of secondary importance to revenue generation, it is enough to ensure that whatever the fee is levied on does not have a detrimental impact on attaining IWM goals.

Likewise, a fee based on the amount of waste disposed would support any of the identified goals except encouraging specified design characteristics and increased postconsumer materials use. Such a fee would encourage consumers to consider factors such as waste prevention, recyclability, reusability, and durability, in addition to conventional factors such as price and brand name when making purchasing decisions.

Delimiting this criteria is actually twofold. Not only must the fee administrator identify in a broad sense what the fee will be levied on (e.g., a product), but the unit for assessing the fee must be specified, as well (e.g., product weight or volume, product units sold, or product lifespan). To realize the fee goal, it is imperative that the fee be levied on a commodity/activity that directly relates to the stated fee objective.

WHO PAYS THE FEE

A third criterion to consider when establishing a fee is who pays the fee. Fees to support IWM and secondary materials market development could be paid by a variety of entities including raw materials producers, product manufacturers, packaging manufacturers, distributors (includes wholesalers and importers), retailers, consumers, waste generators, waste haulers, recyclers, processors, materials recovery facility operators, postconsumer materials marketers, and disposal facility operators.

Generally, fees relating to IWM are said to be "front-end" or "back-end" fees. The front and back-end designations relate to product lifecycle and will be used throughout this document to distinguish fees. A front-end fee is assessed prior to consumption and disposal, while a back-end fee is assessed subsequent to consumption, at the point of disposal. Five of the six fees analyzed in this document (see Sections IV through VIII) are front-end fees. The only back-end fee discussed is unit based disposal pricing (see Section IX).

Depending on fee goal, it may be more logical for a specific entity to pay the fee. If the fee is to generate revenue, then administrative simplicity (e.g., streamlined fee collection process) is likely to be driving force behind assigning responsibility for who pays the fee. But, if the goal of the fee is to effect a behavior, then it is important that the fee be linked to the entity whose behavior is to be modified. While the outcome may be a more complicated fee structure, this maximizes the opportunity for the fee to achieve the intended result.

Regardless of who pays the fee directly to the administering agency, it is likely that fees will be passed on to consumers of the regulated product or service. Whether the behavior modifying impact is passed along with the fee may depend on fee visibility. If consumers understand both that a fee has been levied and the fee goal, they can include this information in their purchasing decisions.

There are additional guidelines to consider when determining who should pay the fee. After deciding fee goal and what the fee should be levied on, the choice of who pays the fee is somewhat constrained. If, based on the fee goal, the fee is to be levied on disposed waste, then it makes most sense use a back-end fee payer that is associated with refuse disposal (i.e., waste generator, waste hauler, or disposal facility operator). Conversely, if the fee is to be levied on a material, product, or package, then it is more logical to use a front-end fee payer (i.e., raw materials producer, package manufacturer, product manufacturer, distributor, retailer, or consumer).

There are many considerations inherent to selecting the appropriate entities responsible for paying the fee. Primary considerations include minimizing the number of entities to be regulated and, for behavior affecting fees, determining who is in control of establishing standards and specifications. Usually, as more entities need to be tracked, administration and enforcement becomes more complicated and costs increase. The need for a tie between who pays the fee and the entity whose behavior is intended to be modified needs to be balanced with this practical aspect of program administration.

For example, package manufacturers respond to specifications established by product manufacturers. Because they cannot force the product manufacturer to modify package specifications, package manufacturers do not have a reliable mechanism to use in avoiding fee payment. As a result of contractual obligations that may prevent behavior modification, a fee intended to effect this goal may be compromised by requiring packaging manufacturers to pay the fee. Furthermore, not being privy to the product manufacturer's distribution system, the package manufacturer has no means to identify which of its packages will eventually be sold in California; thus basic fee administration is complicated. Due to tracking complications, it would be difficult to enforce a simple fee intended to generate revenue.

An additional factor regarding distribution systems needs to be taken into account when determining who pays. A fixed parameter in this document is that any fee will be adopted only by the state of California. This results in unique factors that would be of less concern were the fee to be instituted nationwide. Commercial distribution systems are not contiguous with state boundaries; nor are manufacturers records necessarily set up to track product distribution by state. For this reason, requesting that a raw material, package, or product manufacturer submit fee payments based on the amount of their product sold in California may initially be somewhat onerous.

There are two means to mitigate this factor. Either manufacturers will need to modify their distribution tracking systems to account for the amount of product that is sold in California or the fee could be collected at the first point of in-state sale (i.e., the distributor, wholesaler, or importer). The benefits of requiring distributors to pay the fee is that the number of regulated entities is reduced, foreign goods will be equally subject to regulation, and manufacturers will not need to establish tracking systems to determine in which state their products are sold. The primary loss associated with having distributors pay the fee is that the direct connection between the fee and the entity whose behavior is intended to be modified is broken.

Finally, with respect to a front-end fee, many, particularly those in the commercial sector, argue that the consumer is the appropriate entity to be targeted by any policy to support IWM or secondary materials market development. Manufacturers contend that they simply produce products packaged in the manner that the consumer demands. The implication is that to best change the nature of IWM, it is necessary to change consumer demand. This could be done by still having distributors submit fee payments, but requiring distributors to pass the full fee on to retailers, who then must pass the fee on to consumers, who must be made aware of the fee amount and why they are paying the fee.

Appendix B contains a matrix that provides an analysis of the various potential fee payers. Their primary activities are identified, as are the factors that motivate their behavior. Based on these factors, a list of desired behaviors was developed and the fee options that could motivate those behaviors were identified.

BASIS FOR SETTING THE FEE

The final criteria to delimit when establishing a fee framework is the basis for setting the fee. There are an unlimited variety of calculations available to set a fee level; these options range from very simple to those that are almost unmanageable in complexity. Often fee complexity is a function of striving for equity across fee payers and the regulated commodities. As with the preceding two criteria, it is the fee goal that has great influence on determining a rational basis for setting the fee.

Generally, behavior-modifying fees are more difficult to develop than fees primarily intended to generate revenues. This is because to establish the fee level for a revenue-generating fee, it is only necessary to know the amount of funds required to provide the service and the number of potential fee payers. When attempting to set the fee level for a behavior-modifying fee it is necessary to know the level of behavior that is desired and the relevant elasticities of demand. Elasticity of demand is an economic concept that refers to the change in a consumption pattern that results from a change in price. Due to difficult to quantify consumer preferences, such as brand loyalty, it is a complicated process to set the appropriate fee level that will induce a customer to switch to products that are more complementary to California's IWM goals.

As mentioned, the desire to maximize equity also complicates the basis for setting a fee. This complexity results regardless of the fee goal. The fee used to support Germany's Duales System, a fee whose goal is to generate revenue to support a postconsumer packaging collection infrastructure, illustrates the relationship between equity and complexity.² Initially, the fee used to support the Duales System was the same for all packaging, regardless of material type. Critics charged that this system led to the subsidization of difficult to collect and recycle packaging materials (e.g., plastics) by readily collected and recycled packaging materials (e.g., aluminum). To maintain equity between material types, unique fee formulas were developed for different material types. Fees are further differentiated based on package size and volume. This maintains equity between small and large packages while controlling for the amount of product the package contains.

Attempts to incorporate lifecycle and/or cost-benefit analysis into the fee level is very complex. By identifying costs generated by individuals, but borne by society, externalities can be internalized. This more efficient pricing scheme is designed to lead to purchasing decisions based on true cost. Unfortunately, the type of information required to conduct the analysis is often difficult to obtain and quantify.

SIX FEE TYPES

Six fee types were identified on the basis of the debate stimulated within the IWM community as to their efficacy as tools in redressing IWM and secondary materials market development concerns. The subsequent analysis, which takes place in Sections IV-IX, should be viewed as an attempt to make clarify the debate. The six fees that are analyzed are as follows: mass minimization fee, design characteristic fee, deposit surcharge, advanced disposal-recycling fee, gross receipts fee, and unit based disposal pricing.

Each fee can be described using the framework previously established in this subsection. The following table, titled *Comparison of Six Fee Frameworks*, provides a mechanism to facilitate a comparison of the fees in the context of their framework. For each fee, the goal, what the fee is levied on, who pays the fee, and the basis for setting the fee is identified. For some fees there exist more than one rational response to a criteria. In subsequent sections these fees will be analyzed in terms of their ability to further California's IWM and secondary material market development goals.

² See Emerging Market Development Options Report #2 for an overall review of the German Duales System.

TABLE II-2. COMPARISON OF SIX FEE FRAMEWORKS

	FEE GOAL	WHAT IS THE FEE LEVIED ON	WHO PAYS THE FEE	BASIS FOR SETTING THE FEE
Mass Minimization Fee	waste prevention	product or package	product or packaging manufacturer, distributor, retailer, or consumer	weight or volume of product or package, can correlate to variables such as percent reduction in material use
Design Characteristic Fee	influence design specifications	product or package that does not exhibit desired characteristic	raw material producer, product or packaging manufacturer, distributor, retailer, or consumer	incentive level necessary to induce the desired change in product or package design
Deposit Surcharge	encourage waste collection/diversion	product or package	distributor or retailer	incentive level necessary to induce consumers to return the product/package for their deposit
Advanced Disposal-Recycling Fee	influence design specifications by encouraging consumers to incorporate disposal cost into their purchasing decisions	product or package	product or packaging manufacturer, distributor, retailer, or consumer	cost to collect and dispose-recycle package or product
Gross Receipts Fee	generate revenue	sales, revenue, or profit	product or package manufacturer, distributor, or retailer	flat rate per unit of product or packaging
Unit Based Disposal Pricing	internalize disposal costs and provide incentive to minimize waste generation	disposed waste	waste generator (household or business owner/manager)	full disposal cost

III EVALUATION CRITERIA

CRITERIA OVERVIEW & CHECKLIST

A primary focus of this report is the development of objective criteria that decision makers can use to evaluate policy options for IWM and secondary materials market development. Comparison of dissimilar options is facilitated by using a standard set of evaluation criteria. The criteria discussed in this Section provide a frame of reference to evaluate legislative proposals related to fee and/or manufacturer responsibility options.³ In Sections IV through IX these criteria are used as the basis to evaluate generic fee options.

The process used to select the criteria listed in this chapter consisted of a literature review, discussions among Board staff, public comments, and a review of information provided by contractors assisting in the Emerging Market Development Options Study. The criteria list is intended to be used as a tool to review proposals and should not be considered all-inclusive. The criteria are intended to be used as a checklist to indicate whether a proposal achieves IWM and/or market development goals.

Each criterion is supported by several indicator questions. These questions are intended to generate detailed analysis of each criterion. Based on the specific policy framework and overall goals (see Section II for an overview of a fee framework and goals). Staff identified indicator questions that should be answered affirmatively for an option to be considered minimally effective. These questions are termed "critical." For other questions, an affirmative answer is desirable, but not critical; thus, these questions are termed "desirable." Questions deemed critical or desirable will vary depending on a specific policy's framework and goals and should be adjusted accordingly.

Any fee option under consideration should be evaluated to determine whether it meets the stated criteria. A sample checklist to evaluate prospective options has been developed and is included as Table III-1, titled Criteria Checklist. As stated previously, staff initially identified indicator questions as either critical or desirable; those deemed critical are in bold face type. Because it is unlikely that any one policy option can meet all the criteria and indicator questions, a negative response to a critical indicator question should not necessarily result in an option's elimination from further consideration. Instead, the labels critical and desirable should be used as indicators to identify general trends during the evaluation process. It is possible that policy makers will need to decide whether specific policy goals pre-empt the initial categorization of criteria.

³ See Emerging Market Development Options Report #2 for a discussion of manufacturer responsibility options.

The categorization of the indicator questions under Criterion #1 requires a note of explanation. A policy intended to support IWM and secondary materials market development must increase demand for California's secondary materials; however, the method by which this is achieved (by setting mandates, providing incentives, etc.) is flexible; hence, the indicator questions are deemed desirable, not critical. A general discussion of the criteria and indicator questions follows Table III-1.

TABLE III-1 CRITERIA CHECKLIST (items in boldface type are deemed critical)

CRITERION #1: The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.				
INDICATOR QUESTIONS		YES	NO	UNK
a)	Does the option mandate increased secondary materials utilization?			
b)	Does the option provide incentives to utilize secondary materials?			
c)	Does the option dedicate a revenue source to provide financial assistance for statewide and regional market development?			
d)	Does the option promote increased quality and availability of secondary materials?			
e)	Does the option encourage a shift in investment to technologies that can readily utilize postconsumer content?			
f)	Does the option foster new technologies and continuous improvement in existing technologies?			
CRITERION #2: The option should be practical to implement, administer, and enforce.				
INDICATOR QUESTIONS		YES	NO	UNK
a)	Is there an identified funding source to implement the option?			
b)	Do the projected benefits justify the implementation costs?			
c)	Is the option consistent with existing legislation and trends in CA?			
d)	Does the option include an effective enforcement mechanism?			
e)	Is there a mechanism to measure the option's success?			
f)	Is it expected that the option can be successfully implemented?			
g)	Is the time frame for implementing the option acceptable?			
h)	Does the option build on existing infrastructure in collection/processing/use?			
i)	Is the option consistent with interstate and international trade laws?			

CRITERION #3: The option's impacts on business should be reasonable and appropriately targeted.

INDICATOR QUESTIONS		YES	NO	UNK
a)	Are the identified regulated entities the most appropriate, given the goals and requirements of the option?			
b)	Is the additional regulatory and financial burden placed on business reasonable?			
c)	Is the option likely not to have unacceptable, unintended impacts on business market share, profitability, or other issues?			
d)	Is the option likely not to result in significant business migration from California?			

CRITERION #4: The option should have a net positive economic development impact.

INDICATOR QUESTIONS		YES	NO	UNK
a)	Does the option promote value-adding activities which otherwise would not occur?			
b)	Does the option promote the development of new end use industries for secondary materials?			
c)	Does the option have neutral or positive impact on business development in California?			

CRITERION #5: The option should be consistent with, or it should promote, waste prevention and other integrated waste management goals.

INDICATOR QUESTIONS		YES	NO	UNK
a)	Does the option promote efficient reduction or elimination of waste materials?			
b)	Does the option promote behavior change to support waste diversion programs?			
c)	Does the option promote increased efficiency in local waste management programs?			
d)	Does the option promote compliance with solid waste facility requirements?			

CRITERION #6: The option should equitably distribute the pricing system for waste management services.				
INDICATOR QUESTIONS		YES	NO	UNK
a)	Does the option attempt to account for the full costs of waste management activities?			
b)	Does the option internalize waste management costs into standard business and consumer costs?			
c)	Does the option credit recycling with the avoided costs of disposal?			

CRITERION #1

The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.

The major objective in evaluating fee options is to determine which options provide a mechanism to increase demand for postconsumer materials diverted from California's waste stream. If the reviewed option does not increase demand for postconsumer materials, then the primary objective is not being met. There are several ways to increase demand. Specific options include information campaigns, mandating or promoting postconsumer material use, and providing funding for research and development or loans to postconsumer materials users.

a) Does the option mandate increased secondary materials utilization?

Increased secondary materials use is the primary intent of a secondary materials market development policy; however, a use mandate is not the only means to achieve this end. Thus, while mandating secondary materials use may be desirable, it is not necessary. For example, a surcharge on virgin materials does not mandate secondary materials use, but it provides manufacturers an incentive to maximize their use within the parameters of what is economically and technically feasible.

b) Does the option provide incentives to utilize secondary materials?

Incentives should be strived for. However, if this objective is not met, the proposal may still have benefit. Incentives could include waivers or compliance variances for those using secondary materials. While many proposals can be mandated and do not require incentives for successful implementation, such incentives have the potential to increase compliance rates or otherwise enhance overall performance.

c) Does the option dedicate a revenue source to provide financial assistance for statewide and regional market development?

A funding source dedicated to providing monies for statewide and regional market development is highly desirable, but not essential to promote overall market development goals. The Board's Market Development Zone Loan Program is an example of a money source dedicated to providing supplemental funding to the private sector for market development initiatives. Although a program does not need to dedicate funds for market development, this would guarantee that monies flow to these types of programs. In times of tight budgets for both the public and private sectors, dedicated funding assumes increased importance.

- d) **Does the option promote increased quality and availability of secondary materials?**

Improved quality and availability of secondary materials may not be essential to the success of a given option. The importance of this characteristic varies depending on the material targeted. Some secondary materials, such as plastic, would greatly benefit from policies that increase the quality of diverted materials, while other materials, such as aluminum, would benefit to a lesser extent.

- e) **Does the option encourage a shift in investment to technologies that can readily utilize postconsumer materials?**

This is a desirable outcome of any market development proposal. Encouraging a shift to manufacturing processes and equipment capable of using postconsumer materials should have a positive impact on material demand. For example, a program that encouraged investment in paper deinking technologies would increase demand for postconsumer paper.

- f) **Does the option foster new technologies and continuous improvement in existing technologies?**

Innovation will drive increased secondary materials use, so it is desirable to foster new technologies and improvements in existing technologies. To the extent feasible, incentives for research and development should be incorporated into any fee or manufacturer responsibility proposal. A broad interpretation of technologies includes those that exist at the stages of material collection, processing, and end use.

CRITERION #2

The option should be practical to implement, administer and enforce.

It is essential that the proposed solution provides a framework that is administratively feasible and not overly burdensome to the administering agency or the regulated community. The program should not be extremely complex or require

excessive staffing. Implementation of any option should be as efficient as possible and not be more complicated or costly than the original problem. The presence of money flows requires that both regulators and the regulated be held accountable; therefore, adequate enforcement procedures are essential to these types of policies.

a) Is there an identified funding source to implement the option?

This is a critical item. Proposals that require implementation of a mandate should include a supporting funding source. In the absence of an identified funding source, program implementation will be deficient and resources expended for negotiation and conceptualization of a given proposal will be wasted.

b) Do the projected benefits of the option justify the implementation costs?

This is a critical item that is often difficult to resolve. If net implementation costs exceeds benefits, then it is likely that the option should not be considered. It is often difficult to control for all potential costs and benefits associated with any specific policy. Thus, while this is a critical item, there are caveats that should be stated in relation to its use.

Any attempt to identify and quantify potential costs and benefits should direct special attention to difficult to quantify impacts, such as those that fall outside the marketplace. Those impacts that occur outside the marketplace must be approximated or ignored, which means the result of the analysis is either subject to assumptions or neglects to take into account pertinent information.

c) Is the option consistent with existing legislation and trends in California?

Consistency with existing legislation and trends is desirable. A consistent approach has the benefit of creating certainty in the regulated community. However, to achieve an objective, it may be necessary for policy makers to move boldly and select an option that is contrary to existing legislation and current trends. Change occurs in the wake of departure from the status quo, and it may well be that the policy that most effectively furthers IWM goals is contrary to current conditions.

d) Does the option include an effective enforcement mechanism?

The importance of this item is determined relative to the type of option under review. Some options may require voluntary action for which no enforcement is necessary; others, for a variety of reasons (e.g., money flows or potential for fraud), will require strict enforcement (e.g., AB 2020).

e) Is there a mechanism to measure the option's success?

Measuring an option's impact to determine its success is highly desirable, but not critical. There are varying methods by which to measure success, some of which are more expensive to administer than others. Also, some measurements may be qualitative in nature, while others are quantitative. While quantitative measurements are perceived as more objective, programs do not always lend themselves to this method of analysis. At a minimum, a program should include a means for developing a "ballpark" measurement of success.

f) Is it expected that the option can be successfully implemented?

This is very critical and must be answered in the positive. Before any option is selected there must be a positive assurance by the responsible agency that it is implementable. As mentioned above, not all programs lend themselves to an easy measurement of success. Thus, while uncertainties may exist, there should be generally favorable indicators that demonstrate the policy's ability to be implemented and enforced by the responsible agency and achieve the stated goal.

g) Is the time frame for implementing the option acceptable?

This is a critical item. When the option is implemented it must solve a particular problem at a given point in time. For instance, if it is anticipated that an oversupply of a particular material type will exist in year X, but the proposed solution cannot be implemented until year Y, the question that needs to be answered is can the collection and processing infrastructure sustain itself until the proposed option becomes effective? If the answer is yes, then the proposed option warrants additional consideration. If the answer is no, then a different option should be considered.

h) Does the option build on existing infrastructure in collection/processing/ use?

This is a highly desirable characteristic for any potential market development policy. Many parties, including local governments, private waste haulers, and secondary materials processors and end users, have made substantial investments in infrastructures. Any proposal should be evaluated to determine whether it will have a significant negative impact on existing infrastructure investments.

i) Is the option consistent with interstate and international trade laws?

It is essential that any policy not conflict with established trade laws or the resource expenditure associated with the conflicting policy will be lost. To minimize the possibility of this occurring, Board staff prepared a background report on trade laws and evaluated the potential for conflict with various market development policies. The report is part of this report series and is titled **Emerging Market Development Options Report #5**.

CRITERION #3

The option's impacts on business should be reasonable and appropriately targeted.

Business should not be impacted to the extent that its existence is threatened. The proposed options identified in this report were selected because they have the potential to create a balance of responsibility for waste management and secondary materials market development. Additionally, there should be a direct relationship between the proposed option, the affected parties, and the generation of specific waste types. Any fees collected as part of a market development program should be used to improve diversion economics for the materials, products, or packages subject to the fee.

- a) **Are the identified, regulated entities the most appropriate, given the goals and requirements of the option?**

This is a critical item as the entities regulated should be connected to and able to effect the desired result. If not, anticipated outcomes probably will not be achieved. For instance, if the desired outcome is to increase demand for a given secondary material (e.g., postconsumer plastic), the policy should not focus on unrelated businesses (e.g., gardeners); it should focus on potential users of secondary materials and/or purchasers of products made from these materials (e.g., plastic packaging users or producers or durable goods made from plastic).

- b) **Is the additional regulatory and financial burden placed on business reasonable?**

This is critical as business must not be put in a position of undue hardship as a result of actions intended to stimulate market development and achieve waste management goals. Analysis of the options should identify impacts and attempt to estimate any costs that will need to be incurred by the regulated community.

- c) **Is the option likely not to have unacceptable, unintended impacts on business market share, profitability, or other issues?**

This is a critical requirement in that the option should be neutral and well directed. If the explicit goal of a policy is intentionally prejudiced against a material, product or package, then neutrality is not possible. For example, when a city bans the sale of polystyrene food service packaging, it is making a conscious decision to impact the market shares of companies that produce polystyrene food service packaging and product substitutes. Often a market development or waste diversion goal is not specifically intended to affect a business' market share, but this inevitably occurs. Analysis of any fee or

manufacturer responsibility option should determine the potential affects of implementation on market share, profitability and other related issues.

d) Is the option likely not to result in significant business migration from California?

This is also a critical item because the preferred option(s) should result in a neutral impact or a net increase in business activity in California. A policy that targets manufacturers should not be limited to those that are physically located in the state. Policies that are likely to result in significant migration of business from California should be re-evaluated, and in the absence of an issue of overwhelming public concern (e.g., the industry in question is responsible for an unacceptable public health risk), the policy should not be pursued.

CRITERION #4

The option should have a net positive economic development impact.

Any selected option should have a positive effect on economic development in California. Increased economic activity that results from collection, processing, and end use markets should be equal to or exceed any economic dislocation that may result from a policy's implementation.

a) Does the option promote value-adding activities which otherwise would not occur?

This is a desired result, but not critical for the option to satisfy its given market development objective. Locating value-adding facilities or expanding capacity at existing facilities would benefit the California economy; however, this is not necessary to promote IWM goals. Depending on the costs associated with adding value (e.g., additional sorting or processing requirements), the ability to take advantage of higher end uses may be constrained.

b) Does the option promote the development of new end use industries for secondary materials?

While this a highly desired characteristic, it is not necessary that an option have this characteristic to be considered viable. For instance, it is possible that the preferred option might expand existing activity to the extent that it is more beneficial than creating new end use industries, which potentially could be lower value uses.

c) Does the option have neutral or positive impacts on business development in California?

It is critical for the success of a given option that it not negatively impact business development. This would indicate that a specific secondary materials market development policy is contrary to general economic goals and should not be pursued.

CRITERION #5

The option should be consistent with, or it should promote, waste prevention and other IWM goals.

Any selected option must be consistent with overall IWM goals and not conflict with the existing regulatory framework.

- a) Does the option promote efficient reduction or elimination of waste materials?**

For the purposes of this report, the primary preferred outcome of any selected option is to support market development activities; however, it is desirable that the selected option also promote efficient reduction or elimination of waste.

- b) Does the option promote behavior change to support waste diversion programs?**

Behavior change is also a highly desirable element that is not essential to the goal of supporting successful secondary materials markets in California. A fee mandate does not necessarily require the need for behavior change to occur among all waste management players (i.e., local governments, consumers, and manufacturers). Collected monies can be redistributed to entities whose activities will expand secondary materials markets.

- c) Does the option promote increased efficiency in local waste management programs?**

Increased efficiency is desirable but not critical for success. Efficiency within local waste management programs should always be strived for, and while it complements market development objectives by minimizing collection costs, it is not absolutely essential to advance market development. For instance, with respect to increasing diversion of a specific material type, the underlying problem could be technical in nature and relate to manufacturing processes.

- d) Does the option promote compliance with solid waste facility requirements?**
It is critical that any option chosen for further consideration be consistent with solid waste facility permitting and compliance requirements. This is a

regulatory issue with public health and safety implications that cannot be compromised.

CRITERION #6

The option should equitably distribute the pricing system for waste management services.

The pricing system for full implementation of waste management systems should be distributed equitably among local government, citizens, and manufacturers. Ideally, each should be held accountable for the costs that result from the portion of the waste stream for which they are accountable. No single group or organization within a group should receive preferential treatment or a competitive advantage.

- a) Does the option attempt to account for the full costs of waste management activities?**

It is desirable that the calculation of a selected fee option takes into account the full cost of waste management; however, this is not always possible. The benefit of full cost accounting is that programs then stand or fall simply on their economic merit; however, this principle is easier to discuss in theory than implement in practice. For a host of reasons (e.g., attempting to place market prices on items that do not enter the marketplace, subsidies in the delivery of waste management services, etc.), full cost accounting remains an ideal to which waste management systems can aspire.

- b) Does the option internalize waste management costs into standard business and consumer costs?**

This is a critical item in that often the goal of a manufacturer responsibility or fee option is to internalize waste management costs. The degree to which costs are internalized is the function of a specific policy. When costs are internalized and individuals have complete information relative to costs and benefits, they can rationally optimize their behaviors.

- c) Does the option credit recycling with the avoided costs of disposal?**

It is critical that the cost of recycling should be credited with the avoided cost of disposal. If this does not occur, then cost savings are not being accurately taken into account and a program appears more costly than it actually is. Recycling is often criticized for being more costly than traditional forms of waste management (e.g., landfills and incineration). To properly determine the cost of recycling, it is necessary to calculate the cost that would have been incurred had the waste been disposed, and then credit this amount against the cost of recycling. The avoided cost of disposal

includes components such as avoided tipping fees, potentially decreased waste collection costs (both labor and capital), and avoided costs for constructing new waste disposal facilities.

IV MASS MINIMIZATION FEE

DESCRIPTION

A mass minimization fee is intended to encourage product and/or package manufacturers to minimize the weight or volume of their products/packages. All else equal, this will result in a decline in per capita waste generation rates, so the amount of refuse requiring disposal will decrease and landfill life will be extended. To effect this goal, such a fee would need to be levied on the actual product/package. The scope of the fee can vary considerably. A broad fee might target all consumer products and their packaging, while a narrow fee might seek to address what is perceived to be a particularly troublesome sub-component of the waste stream.

Either the product/package manufacturer or the distributor could be responsible for paying the fee. While it is logical to hold the entity with direct control over the product/package specifications responsible for paying the fee, as mentioned in Section II, there may be additional considerations to factor into the decision-making process. Logistically, it may be easier to require the distributor to pay the fee. If this option is selected, then to maximize the fee impact the distributor should have the ability either to pass the fee on to consumers or to the manufacturer. It is necessary that the entity responsible for paying the fee be able to effect the desired behavior or pass the fee on to an entity that can, otherwise the realized impact of the fee will be limited to revenue generation.

The fee needs to be based on the weight or volume of the product/package. By basing the fee on a discrete unit, such as an ounce or cubic inch, the entity that pays the fee can realize a savings by decreasing the number of ounces or cubic inches in a product/package. Thus, the appropriate incentive to realize the mass minimization goal is incorporated into the fee structure.

The flat rate per weight or volume unit could be established on an arbitrary basis or the fee administrator could attempt to determine the appropriate per unit rate at which product/package manufacturers would reduce their product/package weight or volume sufficiently. This latter basis would be very difficult to determine as the preferences of individual firms would vary considerably. Furthermore, due to the proprietary nature of much of the data required to perform this type of calculation, it would be very difficult for the state to obtain the requisite information.

If the fee is set arbitrarily, the mass minimization impact that will be realized remains unknown. Technical barriers could further affect the potential for the fee to attain its mass minimization goal. For example, if the walls of a corrugated container cannot be made any thinner without compromising structural integrity during the distribution process, a mass minimization fee placed on this commodity may not have any impact beyond revenue generation. Due to the complications

associated with selecting the appropriate basis for setting the fee, the range of products/packages covered by the fee should be carefully considered.

PRECEDENTS

The survey of waste management officials (summarized in Appendix A) did not produce a case study of an implemented mass minimization fee. Some fees have been assessed where their primary goal is not to encourage mass minimization, but this results from the inherent fee structure. For example, in Germany the Duales System arranges for the collection of used packaging from households. To pay for this service, the Duales System charges its member a fee based on package size and volume. The goal of the fee is to cover packaging collection and processing costs, but an unintended benefit is that a fee based on package size and volume encourages product manufacturers to reconsider their packaging choices and seek to minimize package size. Manufacturers have indicated the Duales Systems' fee has caused them to pursue additional reduction in materials use in their packaging.

KEY FINDINGS (CRITERIA ANALYSIS)

Criterion #1: The option should increase demand for California's secondary materials to help achieve statewide diversion goals.

Alone, a mass minimization fee will not increase demand for California's secondary materials. This fee type has no inherent market development component. The primary impact is with respect to other IWM goals, namely waste diversion by means of waste prevention. The basis for calculating the fee could be modified slightly to encourage use of postconsumer materials. For example, a portion of the fee could be rebated based on the percent postconsumer content in the product/package. Still, this does not guarantee that the increased demand for postconsumer materials will be experienced in California. Revenues generated by this fee could be devoted to market development activities, such as augmenting the existing Recycling Market Development Zone Loan program or providing rebates to manufacturers that use designated postconsumer materials. Fee redistribution may be more likely to have a direct impact on demand for materials diverted from California's waste stream than the fee itself.

Criterion #2: The option should be practical to implement, administer, and enforce.

Implementation, administration, and enforcement could be very resource intensive for both the public and private sector. If the fee is broadly applied and paid by manufacturers, it would require identifying thousands of manufacturers that sell their products in California. Due to financial implications, a reliable paper trail would be necessary to document the amount of product the manufacturer sold in California. Based on experience in developing other Board programs it is likely that a proxy, such a population, may initially need to be used to estimate the amount of

product sold in the state. The successful implementation and on-going administration of programs, such as the newsprint recycled content program, illustrate that the Board does have the necessary level of expertise to implement a complicated program that requires tracking large numbers of entities located throughout the nation.

Criterion #3: The option's impact on business should be reasonable and appropriately targeted.

As previously mentioned in the description subsection, it is important that the fee be paid by the entity, or paid by another entity but passed on to the entity, that controls the product/package specifications. Because a fee will increase the cost of a product/package, it is essential that substitution effects be considered. For example, if the fee is narrowly applied to a specific product/package type, then the fee administrator should evaluate the incentive this may have to encourage manufacturers to consider another package and consumers to consider product substitutes. For example, a fee on corrugated shipping containers might encourage manufacturers to switch to shrink-wrapped pallets. The pros and cons of possible substitutions need to be considered prior to committing to a fee. Broadly applying the fee to many product/package types should preclude an impact that varies between and within industrial sectors.

Criterion #4: The option should have a net positive economic development impact.

Due to the fact that the policy option being explored is a fee, it is unlikely that there will be an overall positive economic development impact. If administrative overhead is kept to a minimum, then it is likely that economic dislocation will be kept to within an acceptable threshold. Distribution of collected fees will further mitigate any negative impact on economic development.

If the fee is paid by product manufacturers and fees are redistributed primarily to California businesses (this is reasonable given the goal of promoting California secondary materials), then the net impact on California should be positive. This is because the fee is a cost borne by entities regardless of where they are located, but the benefits of this fee would be concentrated in California. If distributors, entities that are located in the state, pay the fee the opportunity to externalize a portion of the cost is lost. While overall, the fee is unlikely to result in a net positive economic development impact, its impact in California may be positive.

Criterion #5: The option should be consistent with, or it should promote, waste prevention and other IWM goals.

As stated previously, the primary goal of this fee is to provide a waste prevention incentive. It is not a market development tool in its own right, although the monies it generates can be devoted to market development activities. This fee would

provide product and/or package manufacturers an incentive to reduce the size of their product/package.

Criterion #6: The option should equitably distribute the pricing system for waste management services.

Given the fee goal of minimizing package/product size, the pricing system issue does not arise. In this document a fee calculation that takes into account the pricing system for waste management services and then attempts to equitably distribute the costs among various parties is called an advanced disposal-recycling fee. Unit based disposal pricing also strives to equitably distribute costs.

V DESIGN CHARACTERISTIC FEE

DESCRIPTION

This fee type is intended to influence product and/or package design specifications. Those products/packages that do not meet the specified design criteria would be charged a fee. With respect to any specific fee, the goal would need to be further refined. For example, a fee could encourage compostable, recyclable, or reusable products/packages. The fee also could be structured to encourage the use of specified materials including postconsumer materials. If levied only on virgin materials, this fee would increase the relative attractiveness of materials recovered from the waste stream. Recovered materials would not be subject to the fee, so the price differential between virgin and recovered material would no longer be a valid reason to prefer virgin feedstock. When levied only on virgin materials, this fee is often referred to as a virgin materials tax.

Not only may any design characteristic be targeted using this fee, but virtually any product or package can be subject to the fee. Theoretically, as long as there is an objective means to determine whether a product/package possesses the desired characteristic, then it is possible to levy a fee based on that characteristic. As with the mass minimization fee, the fee scope can be broad (e.g., all plastic) or narrow (e.g., resin used to manufacture point-of-sale food containers).

The entity best able to control the targeted design specification should be assessed the fee. This direct link maximizes the potential for the fee to have its intended impact. This would imply that the product manufacturer, the entity that specifies product and package design, would pay the fee. While the direct link exists, the large number of product manufacturers and the fact that the fee would only be levied on products actually sold in California complicate holding this entity responsible.

An alternative would be for the entity responsible for importing a product into the state, the distributor, to be responsible for paying the fee. However, distributors purchase products from manufacturers, so there is no existing mechanism to pass the fee back up the distribution and manufacturing chain, thereby providing a signal to manufacturers to alter design specifications. Distributors could seek reimbursement from product manufacturers or the distributor could opt to stock only products/packages that conform to the desired design criteria. Whether this would occur depends largely on how the fee impacts the relative price of competing brands and product substitutes.

If the fee is levied on virgin materials use in products/packages, then it is also logical to consider raw materials producers potential fee payers. Not only would these entities comprise the fewest points from which to collect fees, but their relationship to product manufacturers would allow them to pass the fee on to these decision-makers who can then optimize their use of secondary materials.

Regardless of the specific goal, requiring retailers or consumers to pay the fee would be cumbersome due to the large number of entities involved. Furthermore, if either of these entities were to pay the fee, there is no guarantee that the fee would cause product manufacturers to alter their material specifications. This would depend on whether the fee induced customers to purchase "more desirable" products and whether the product manufacturer could ascertain that it was the specific design characteristic that was placing its product at a disadvantage. It would not be logical to hold the package manufacturer responsible for the fee because the package manufacturer is largely at the mercy of the product manufacturer when it comes to establishing package specifications.

The basis for setting the fee would vary depending on the specific fee goal. Ideally, the fee level should be tied to the per unit price differential between a product/package that does exhibit the desired design characteristic and one that does not. Because there are an infinite number of variables that affect product/package price, it may be difficult to determine what portion of the price is attributable to any specific design characteristic. Still, if possible, this calculation basis is preferred. If the fee is set arbitrarily, the influence on design specification will be unknown. Although the specific outcome of such a fee cannot be predicted, the general consequences are such that, at the very least, a modicum of the desired behavior change will be effected. Technical barriers could further affect the potential for the fee to attain its goal; for this reason, such impediments should be fully analyzed prior to recommending a design characteristic fee.

PRECEDENTS

The survey of waste management officials (summarized in Appendix A) did not produce a case study of an implemented design characterization fee. However, several implemented manufacturer responsibility policies exist that share the goal of influencing product/package design including material feedstock choice. Please consult Emerging Market Development Options Report #2 for a review of these programs.

KEY FINDINGS (CRITERION ANALYSIS)

Criterion #1: The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.

This fee can be structured to increase demand for California secondary materials. To provide this incentive, the fee should be levied only on virgin materials use. Still, this is no guarantee that there will be increased demand for California materials, as opposed to materials from another state or region. The proximity of processing facilities and users of recovered feedstock to California is one indicator of the potential impact this type of fee could have on California secondary materials markets.

Other design-based fees might improve the quality of diverted materials, thus indirectly improving diversion economics and boosting demand. For example, multi-resin plastic products/packages have hindered development of a plastics recycling infrastructure. A fee correlated to the number of different resins used in a product/package would encourage manufacturers to minimize the number of resins used in a given product/package. This would facilitate sorting processes and improve the economics of plastics recycling, thus having an indirect impact on demand. Collected fees can be redistributed to provide additional support to secondary materials market development. These fees can be directed to programs that will create demand for materials diverted from California's waste stream.

Criterion #2: The option should be practical to implement, administer, and enforce.

The practicality of this option varies with the fee scope and who pays the fee. Generally, regardless of the specific fee goal, existing complex product distribution systems make it more practical to regulate product distributors than raw materials producers or product manufacturers. With respect to a fee on virgin materials, if the fee scope is broadly based on material type and is paid by the raw material producer, then the program would be relatively manageable. The fee becomes less practical if it requires extensive differentiation based on material end use. If this is the case, then it may be difficult for raw material producers to ascertain the use to which their product will be put; therefore, manufacturers would need to be involved in program implementation or enforcement. Due to the large number of manufacturers, relative to raw material producers, program administration would become more complicated.

Another issue complicating implementation of a fee on virgin materials is the fact that the fee would only be assessed on materials sold in California. If levied on raw material sales, this would place California raw material products at a disadvantage relative to businesses located in other parts of the US. To remedy this bias against California business, it would be necessary to levy the fee on products/packages and then require fee payment by all raw material producers (regardless of physical location) that sell materials to manufacturers that sell products/packages in California. This would be extremely complicated.

Criterion #3: The option's impacts on business should be reasonable and appropriately targeted.

Generally, the fee should be paid by the entity, or paid by another entity but passed on to the entity, that controls the product/package specifications. Hence, it is appropriate to require the product manufacturer to pay the fee. For the purpose of administrative efficacy, it is appropriate for distributors to pay the fee. Although raw material producers do not make decisions regarding which materials will be used as production feedstocks, through their pricing signals they influence manufacturers' material choices. In this sense it is both reasonable and appropriate to consider requiring raw materials producers to pay a fee on virgin materials use.

When evaluating which products/packages are regulated, the fee administrator needs to consider potential substitution effects and the impact this will have on regulated entities, product/package design, and revenue generation. Depending on substitutability, which will vary greatly by product/package type, the fee could result in unintended impacts. If manufacturers are constrained in their ability to adopt the preferred design characteristic, one unintended impact is that a fee intended to affect behavior is reduced to a revenue source. If the fee can be calculated based on the cost differential of providing the desired attribute, there should not be undue concern about a substitution effect. In the absence of adopting the preferred design characteristic, substitution is the fee goal.

Criterion #4: The option should have a net positive economic development impact.

Due to the fact that the policy option being explored is a fee, it is unlikely that there will be an overall positive economic development impact. If administrative overhead is kept to a minimum, then it is likely that economic dislocation will be kept to within an acceptable threshold. Distribution of collected fees will further mitigate any negative impact on economic development.

If the fee is paid by raw materials producers or product manufacturers and fees are redistributed primarily to California businesses (this is reasonable given the goal of promoting California secondary materials), then the net impact on California should be positive. This is because the fee is a cost borne by entities regardless of where they are located, but the benefits of this fee would be concentrated in California. If distributors, entities that are located in the state, pay the fee the opportunity to externalize a portion of the cost is lost. While overall, the fee is unlikely to result in a net positive economic development impact, its impact in California may be positive.

Criterion #5: The option should be consistent with, or it should promote, waste prevention and other IWM goals.

Only when product /package material is the targeted design characteristic can market development be this fee's primary goal. Other design characteristics that could be targeted are generally supportive of existing IWM goals. However, it is possible that a design characteristic fee could conflict with other IWM goals. For example, with respect to the previous example of multi-resin plastic products, it is possible that a decrease in the number of resin types could result in an overall increase in resin use. Plastic laminates sandwich together thin layers of various resins. If only a single resin were used the overall thickness of the one layer may increase. Because there exists the potential for conflicts within the IWM hierarchy, the fee administrator should carefully examine any specific design characteristic fee to determine whether unintended impacts exist.

Criterion #6: The option should equitably distribute the pricing system for waste management services.

Given the fee goal of influencing product/package design, the pricing system issue does not arise. In this document a fee calculation that takes into account the pricing system for waste management services and then attempts to equitably distribute the costs among various parties is called an advanced disposal-recycling fee. Unit based disposal pricing also strives to equitably distribute costs.

VI DEPOSIT SURCHARGE

DESCRIPTION

A deposit surcharge is placed on products/packages to encourage consumers to return the used item for a refund. Often distributors pay the fee directly to the administering agency, and at the time of purchase the consumer pays a deposit, which is refunded if the used item or its package is returned. Although the space required for a central collection point for like products/packages may be problematic for retailers to provide, it has a beneficial impact on material collection economics and can enable additional recycling to occur.

Program administration is facilitated by requiring distributors to pay the fee to the collecting agency and then pass the surcharge on to retailers who charge the fee to consumers. The fee is a flat rate per product/package and the appropriate level is that which will induce consumers to return their used product/package. Fees can vary by product/package size and material.

Because consumers will not always return all their used products/packages for the refund, there will be residual monies. These monies can be used to fund program administration, provide funds to offset private-sector costs (such as retailer space dedication to collect materials), and/or finance new or existing market development efforts.

PRECEDENTS

Historically, this type of fee has been popular as a means of litter control. Over a dozen states, including California, have implemented beverage container deposit laws. These laws generally require regulated products to be labeled. More recently deposit surcharges have been used to encourage consumers to return lead-acid (i.e., vehicle) batteries for recycling. Over time, lead-acid batteries disposed in landfills leach hazardous materials, such as heavy metals and acid, that could contaminate groundwater. A refundable surcharge encourages consumers to return old batteries to the store where they purchased them, thereby keeping potential contaminants out of the landfill.

This type of legislation has been very successful in achieving its stated goal. In California, the beverage container redemption rate exceeds 90 percent. Determining the appropriate fee level required to induce consumers to redeem their used product/package may be difficult. For example, the initial per container redemption value in California was increased in November 1989 and in January 1990. If specified redemption rates are not attained by given deadlines, the deposit amount may be ratcheted up.

California's beverage container deposit program is unique relative to others implemented in the US. There are complicated money flows between various

players that result in significantly lower implementation costs relative to programs in other states. Due to this additional internalization, the California program cannot be compared to traditional deposit surcharge programs.

KEY FINDINGS (CRITERION ANALYSIS)

Criterion #1: The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.

A deposit surcharge would not directly increase demand for California secondary materials. Because this system involves centralized material collection, it could have a positive impact on collection economics, thereby leading to a decrease in the cost of recycling and a relative increase in demand for recovered materials. This would be an indirect increase in demand, the magnitude of which would be difficult to predict. Due to the focus on collection of California materials, the fee impact should be focussed in the state.

Nevertheless, without a mandatory recycling component and a complementary market development policy, there is no guarantee that the collected materials will actually be recycled. Both components are necessary, if only the former is present, it is possible that a situation analogous to that in Germany might occur. In Germany there are mandatory collection and recycling rates, but the market development program component is weak, and collected materials are being disposed, some have even been found in waste streams of neighboring countries.

Criterion #2: The option should be practical to implement, administer, and enforce.

The deposit surcharge system has proven over time in several states that it can be implemented, administered, and enforced. The real issue is at what cost (this will be discussed under Criterion #3 and #4). Requiring distributors to channel funds to the administering agency minimizes the number of collection points.

Criterion #3: The option's impacts on business should be reasonable and appropriately targeted.

Deposit surcharge laws have focussed on beverage containers and lead-acid batteries. These are relatively narrowly defined products that were causing specific problems in terms of their potential to become litter and contaminate groundwater.

A broader program, imposing deposits on a wide range of materials may not merit the resulting economic dislocation. On the other hand, it may be that as program scope is broadened and a greater segment of the waste stream is addressed, efficiencies will be realized and the per unit program costs decrease. Cost analysis of a specific proposal should be completed prior to the proposals recommendation.

Criterion #4: The option should have a net positive economic development impact.

Due to the fact that the policy option being explored is a fee, it is unlikely that there will be an overall positive economic development impact. If administrative overhead is kept to a minimum, then it is likely that economic dislocation will be kept to within an acceptable threshold. Because it is likely that fees would be paid to the administrator by distributors, entities that are located in the state, there is no opportunity to externalize a portion of the cost associated with the fee. Distribution of residual deposits will help to mitigate any negative impact on economic development.

Criterion #5: The option should be consistent with, or it should promote, waste prevention and other IWM goals.

A deposit surcharge primarily promotes material collection, thus increasing the potential for diversion. It can include a mandatory recycling component, in which case it would explicitly complement waste diversion goals. This fee has no inherent incentive to reduce waste generation or require secondary materials use, which would support market development goals.

Criterion #6: The option should equitably distribute the pricing system for waste management services.

Given the fee goal of encouraging consumers to return used products/packages, the pricing system issue does not arise. In this document a fee calculation that takes into account the pricing system for waste management services and then attempts to equitably distribute the costs among various parties is called an advanced disposal-recycling fee. Unit based disposal pricing also strives to equitably distribute costs.

VII ADVANCED DISPOSAL-RECYCLING FEE

DESCRIPTION

This fee is intended to internalize disposal and/or recycling costs. The fee is placed on products/packages and can be paid by various entities including the product manufacturer, distributor, retailer, or consumer. As with previously discussed fees, the distributor may be the most efficient entity to hold responsible for channeling monies to the administering agency. If the distributor assumes this role, it may be beneficial for the fee to be passed on to either the consumer (through the retailer) or the product manufacturer. It is important that the consumer be educated as to the nature of the price increase that results from the fee. If this is not the case, consumers have no basis to understand that by modifying their behavior (the appropriate behavior being to purchase products with lower disposal/recycling costs) they can reduce the amount of fee they are required to pay. Requiring consumers to pay this fee at the point-of-sale encourages them to factor these costs into their purchasing decision; thus, the consumer should make purchasing decisions more rationally. If the fee is passed back to the manufacturer, then this entity has a direct incentive to specify products/packages with lower disposal-recycling costs.

The scope of products/packages that are regulated can be broad or narrow; however, if a narrow scope is applied then the impact on product/package substitutes needs to be considered. The fee level should be established based on the full cost of disposal or recycling. Determining full costs are difficult. This often requires obtaining information that does not presently exist. Many costs are associated with activities that do not ever enter a marketplace, so quantifying these costs is difficult. Furthermore, there is virtually an infinite number of variables that can be included in full cost accounting. Knowing when to draw the line in terms of which costs are included can be difficult, as well. Setting a fee at an arbitrary level will still send a signal to consumers; however, the fee goal, disposal/recycling cost internalization and enhanced rationality of purchasing decisions, will be compromised and the fee may not be as effective as anticipated.

PRECEDENTS

There are several well documented examples of enacted advanced disposal-recycling fees including those found in Germany, Florida, and California. The German fee arose as a consequence of the Ordinance on the Avoidance of Packaging Waste, which was enacted in 1991.⁴ As a means to avoid the law's deposit surcharge provision, manufacturers that sell products in Germany formed an industry consortium. This consortium, the Duales System Deutschland,

⁴ See Emerging Market Development Options Report #2 for a more complete discussion of the German Program.

finances a household packaging collection and recycling system that parallels existing household refuse collection services. This service is financed by a fee placed on packaging sold in Germany. The fee is paid by manufacturers and is based on package size and volume. Because manufacturers pay the fee, they have an incentive to minimize material use.

There has been criticism that because the initial fee structure did not differentiate on the basis of material type, that easy (i.e., cheap) to recycled packages were subsidizing the recycling of more difficult (i.e., more expensive) to recycle packages. To eliminate this inequity, future fee structures will be based not only on package size and volume, but also on material type.

Unlike the German fee, the Florida fee is a legislated mandate (Florida Statutes 88-130 and 93-207). Its goal is to promote refuse diversion and secondary materials use. The fee is paid by distributors to the Department of Revenue, but it must be collected by retailers who can choose to absorb the fee or pass it on to consumers. Retailers are required to alert consumers to the fee by placing a sign in general view, using shelf labels, or noting the fee on the receipt. The fee is levied on specified packaging containers that either fail to achieve a requisite recycling rate or do not contain recycled content in the prescribed amount. The fee rate is arbitrarily set at one cent per container and will increase to two cents per container in January 1995.

The exemption for products that attain specified recycling rates or use minimum levels of recycled materials provides an incentive for manufacturers to modify their behavior. Specifically, they can specify recycled materials in their product packaging or they can support diversion activities. So far, containers made from aluminum and steel have attained a sustained recycling rate in excess of 50 percent. These containers are not assessed a fee when sold in Florida. The desire to avoid paying the fee is so strong that program administrators anticipate as many as 75 to 80 percent of all containers will be exempt. Containers made from plastic, glass, or plastic-coated paper remain subject to the fee. In the future, there is the possibility that material-specific fees will be developed, in which case there may be additional incentive for manufacturers to consider specifying recycled materials in their packaging.

The Florida fee is anticipated to raise \$23 million in the first year. Revenue will decrease as additional containers are exempted. These monies are used to finance various programs, some of which relate to IWM and others of which the nexus is less clear. For example, 30 percent of the funds are dedicated to providing recycling grants to counties, and another twelve percent of the funds are used to finance improved recycling markets. The remaining funds (58%) are used in sewage discharge and treatment programs and surface water improvement

fees makes the program vulnerable to criticism. Parties that pay the fee, and thus incur at least a modicum of administrative cost, are likely not to be pleased that monies are used to fund unrelated programs.

In California the beverage container deposit program includes an advanced recycling fee component. Commonly referred to as the processing fee, this fee is intended to make it economically feasible for the recycling industry to bring empty beverage containers to market. The processing fee is based on the difference between scrap values and the cost of recycling. Thus a processing fee is assessed only to beverage containers made from materials for which the cost to recycle exceeds the scrap value. The fee is paid by beverage manufacturers. Revenues from processing fees provide direct funding to recyclers and processors so they can recycle beverage containers without incurring a financial loss.

KEY FINDINGS (CRITERION ANALYSIS)

Criterion #1: The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.

The structure of an advanced disposal-recycling fee does not provide an incentive for manufacturers to use secondary materials. Nor will the fee directly result in increased demand for materials diverted from California's waste stream. Without attention to enhancement of market demand, it is possible that the increased diversion that could result from this policy will result in a "flood of recyclables". In turn, this will lead to depressed prices for secondary materials which could jeopardize the integrity of the collection and processing infrastructure due to unanticipated price fluctuations. There is an obvious nexus when advanced disposal-recycling fees are used to finance collection and disposal or recycling programs. To maximize this fees potential, monies should also be used to support market development activities. Also, parallel policies that focus on stimulating demand for California secondary materials, such as those discussed in the **Emerging Market Development Options Report #2**, could be implemented in conjunction with this fee. Another incentive for manufacturers to use postconsumer materials could be incorporated into the fee structure by assessing a lower fee to products/packages that meet or exceed specified levels of postconsumer materials use. As evidenced by the implementation of Florida's fee, providing an exemption for packages that use specified levels of recycled content will induce many manufacturers to pursue this course.

Criterion #2: The option should be practical to implement, administer, and enforce.

⁵ *The Advanced Disposal Fee -- What Is It? Questions and Answers.* Department of Environmental Protection, State of Florida. Tallahassee, Florida.

Establishing the appropriate fee level (i.e., that which is equal to the cost of disposing-recycling the product/package) can be resource intensive and difficult; however, once the fee level has been determined, then administration and enforcement parallel that of other fees. Requiring distributors to pass fees on to the administering agency minimizes the number of collection points; still, regardless of fee scope, thousands of distributors that sell products in California would need to be identified. Due to financial implications, a reliable paper trail would be necessary to document the amount of product sold in California.

Criterion #3: The option's impacts on business should be reasonable and appropriately targeted.

Consumers, the entities that generate the waste, ultimately pay the fee. As long as the fee is applied consistently between competing brands and products, one brand and its manufacturer will not benefit from the fee without warrant. By requiring distributors to forward fees to the administering agency, overall inconvenience to business is minimized. Distributors know which products are sold in the state and also constitute fewer points of collection than either manufacturers or retailers.

Criterion #4: The option should have a net positive economic development impact.

Due to the fact that the policy option being explored is a fee, it is unlikely that there will be an overall positive economic development impact. If administrative overhead is kept to a minimum, then it is likely that economic dislocation will be kept to within an acceptable threshold. Distribution of collected fees will further mitigate any negative impact on economic development.

If the fee is paid by product manufacturers and fees are redistributed primarily to California businesses (this is reasonable given the goal of promoting California secondary materials), then the net impact on California should be positive. This is because the fee is a cost borne by entities regardless of where they are located, but the benefits of this fee would be concentrated in California. If distributors or retailers, entities that are located in the state, pay the fee the opportunity to externalize a portion of the cost is lost. While overall, the fee is unlikely to result in a net positive economic development impact, its impact in California may be positive.

Criterion #5: The option should be consistent with, or it should promote, waste prevention and other IWM goals.

Determining the precise cost of disposal-recycling will likely be a function of material type and amount of material. A fee that increases with the amount of material used has an inherent waste prevention incentive. Relating the fee to recycling cost will encourage use of materials that are cheaper, and often easier, to recycle; thus, additional recycling should occur.

Criterion #6: The option should equitably distribute the pricing system for waste management services.

This option requires consumers to pay the disposal-recycling cost up front. An oft heard criticism of many waste collection services is that users are not billed directly. Instead waste collection services are financed out of general revenues; thus, consumers do not need to consider disposal-recycling costs when making purchases. An advanced disposal-recycling fee is intended to compensate for this shortcoming. Forcing consumers to include disposal-recycling cost in their purchasing decision, should induce consumers to moderate waste generation.

This fee does not necessarily shift disposal costs from taxpayers to generators. Unless specified in enabling legislation, it would not supplant existing systems for financing waste collection services. This fee would likely be in addition to existing local financing strategies. Thus, depending on how collected fees are distributed, there is potential for consumers to pay twice for the privilege of disposing waste. The equity of this is a decision best left to policy makers. To minimize the perception of double billing, the advanced disposal-recycling fee could be used to pay for postconsumer material processing and marketing to end users, to finance secondary materials market development programs, or to promote other IWM goals.

VIII GROSS RECEIPTS FEE

DESCRIPTION

The purpose of a gross receipts fee is to raise revenue; no behavior modification is intended. Because the purpose of the tax is to raise revenue, it would be counterproductive to provide a loophole that would support IWM goals. Such a loophole may cause uncertainty in estimating the amount of revenue that would be generated because the number of entities taking advantage of the loophole would be unknown. Given the goal of this document, to explore a fee's ability to support secondary materials market development, it is assumed that the revenue generated by such a fee would be used to promote new and existing market development programs.

The fee could be paid by front-end fee payers such as raw materials producers, product manufacturers, distributors, or retailers and could be levied either as a fraction of the firm's California derived revenues, sales, or profits, or as a graduated flat rate (i.e., if revenues are between \$x and \$y, then pay \$a; if revenues are between \$y + 1 and \$z, then pay \$b). Due to the large number of entities across which this fee would be determined, it is unlikely that the size of the fee would be burdensome to any individual company. However, in the event that this problem should arise, a small business provision could be built into the fee structure.

PRECEDENTS

The survey of waste management officials (summarized in Appendix A) produced two examples of implemented gross receipts taxes. These two programs are in the states of Nebraska and Washington. The fees are similarly structured. Both are intended to generate revenues to be used to finance IWM programs. In Nebraska the funds are distributed in the form of grants to local communities, and in Washington funds are targeted at litter control and recycling programs. Fees are levied on products and packaging that tend to become litter (in Nebraska periodicals are exempt). In both Nebraska and Washington the fee is paid by entities that manufacture, distribute, or sell specified products. The state of Nebraska bases the fee on the value of products sold; the fee is \$150 per one million dollars of product sold. The basis for the fee charged by the state of Washington is similar. The rate is \$150 per million dollars of profit. No significant price increases were noted by Washington IWM officials subsequent to the fee's enactment.

KEY FINDINGS (CRITERION ANALYSIS)

Criterion #1: The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.

The fee itself will not increase demand for California's secondary materials. Secondary materials market development goals can be promoted through fee redistribution. Targeting California diversion programs and postconsumer materials end users will enhance the probability that fee redistribution will cause increased diversion of California materials.

Criterion #2: The option should be practical to implement, administer, and enforce.

Practicality of implementation is similar to that of other policies that seek to regulate large numbers of entities. To the extent that this particular fee could parallel existing corporate income tax structures administration and enforcement are simplified.

Criterion #3: The option's impacts on business should be reasonable and appropriately targeted.

Currently one could argue that manufacturers are not making a contribution similar to that of California's local governments to ensure IWM's long-run success. While this fee, through its redistribution, has the potential to remedy some of the existing inequity in terms of "who pays", it does so in a rather burdensome manner. Positive behaviors are not rewarded, so there is no incentive to voluntarily contribute to IWM goals. This could be viewed as unreasonable.

Criterion #4: The option should have a net positive economic development impact.

Due to the fact that the policy option being explored is a fee, it is unlikely that there will be an overall positive economic development impact. If administrative overhead is kept to a minimum, then it is likely that economic dislocation will be kept to within an acceptable threshold. Distribution of collected fees will further mitigate any negative impact on economic development.

If the fee is paid by raw material producers or product manufacturers and fees are redistributed primarily to California businesses (this is reasonable given the goal of promoting California secondary materials), then the net impact on California should be positive. This is because the fee is a cost borne by entities regardless of where they are located, but the benefits of this fee would be concentrated in California. If distributors or retailers, entities that are located in the state, pay the fee the opportunity to externalize a portion of the cost is lost. While overall, the fee is unlikely to result in a net positive economic development impact, its impact in California may be positive.

Criterion #5: The option should be consistent with, or it should promote, waste prevention and other IWM goals.

As mentioned previously, the goal of this fee has no explicit behavior modification

component; it solely promotes revenue generation. Redistributed fees can be used to fund programs that are consistent with waste prevention and other IWM goals.

Criterion #6: The option should equitably distribute the pricing system for waste management services.

Given the fee goal of revenue generation, the pricing system issue does not arise. In this document a fee calculation that takes into account the pricing system for waste management services and then attempts to equitably distribute the costs among various parties is called an advanced disposal-recycling fee. Unit based disposal pricing also strives to equitably distribute costs.

IX UNIT BASED DISPOSAL PRICING

DESCRIPTION

This is the only fee discussed in this document that is assessed after waste is generated. This back-end fee is intended to internalize disposal costs and promote waste prevention and recycling as viable alternatives to traditional disposal. The fee is levied on disposed refuse and is paid by waste generators. Fee level is determined according to the weight or volume of refuse that requires disposal. Basing the fee on the amount of refuse that requires disposal should create an incentive to reduce disposed waste.

There are at least three different ways to monitor and measure the amount of waste generated. It can be measured per can or bag (waste generators must use cans/bags approved by the jurisdiction); it can be measured using any bag that has a jurisdiction-approved tag or sticker; or it can be measured by weighing the refuse. The specific unit used to implement unit based disposal pricing should be determined by a jurisdiction after evaluating current collection practices and infrastructure.

PRECEDENTS

Unit based disposal pricing is increasing in popularity throughout the US. According to a survey conducted by Washington-based Synergic Resources Corporation, over 1,000 communities have unit based disposal pricing and another 800 indicated that they expected to implement this pricing structure.

Program sophistication varies greatly. At the low-tech end, a program may consist of simply charging residents a fee for the use of more than one refuse container. The City of Seattle implemented a pilot high-tech version of unit based disposal pricing. As part of this program, collection trucks were retrofit with scales and individual refuse containers were weighed before being emptied. Bar codes are placed on the refuse containers and read into a computer on the collection truck to ensure proper billing. Somewhere in between these two extremes is where most unit based disposal pricing programs fall.

The Seattle case study is perhaps the best documented example of the impact of unit based disposal pricing on waste disposal rates. As part of this case study, participants were to be billed according to the weight of the refuse they disposed. Measurement increments were small, so residents had incentive to pursue even marginal reductions. Over the three months for which disposal was tracked, average disposal rates fell by approximately 15 percent. The pilot was considered a success; however, due to existing commercial contracts it was not instituted city-wide on a permanent basis.

KEY FINDINGS (CRITERION ANALYSIS)

Criterion #1: The option should increase demand for California's secondary materials to help achieve statewide waste diversion goals.

This option does not have a direct market development impact. Without attention to enhancement of market demand, it is possible that the increased diversion that could result from this policy will result in a "flood of recyclables". In turn, this will lead to depressed prices for secondary materials which could jeopardize the integrity of the collection and processing infrastructure due to unanticipated price fluctuations. Because user charges are used to finance collection and disposal services, there is no residual monies to redistribute in support of market development initiatives. To maximize the potential of this pricing structure, parallel policies that focus on stimulating demand for California secondary materials should be implemented in tandem with unit based disposal pricing.

Criterion #2: The option should be practical to implement, administer, and enforce.

Programs of this type have been implemented throughout the nation, this serves as testimony to the effectiveness of this particular fee structure. Conceptually, unit based disposal pricing parallels financing structures used for other utilities. A jurisdiction can tailor a program to take advantage of existing infrastructure. Illegal dumping may become a concern, at which time creative enforcement solutions should be explored.

Criterion #3: The option's impacts on business should be reasonable and appropriately targeted.

This option does not target business, except as a waste generator. Most businesses already pay directly for waste management services, so a fee of this type would have little or no direct impact on the commercial sector.

Criterion #4: The option should have a net positive economic development impact.

There may be substantial short-run costs associated with implementing unit based disposal pricing. Often a jurisdiction may need to make a substantial capital investment in new trucks, containers, and other equipment. Up-front capital expenditures can be kept to a minimum, if the fee structure is sensitive to existing collection practices and infrastructure. Previously, if services were financed previously using general revenues, then, as with most utilities, it will be necessary to institute a billing system. However, over the long run a locality should notice a reduction in operating costs because less waste requires disposal.

Criterion #5: The option should be consistent with, or it should promote, waste prevention and other IWM goals.

This option does not have a direct market development component; instead, it is intended to promote waste prevention and recycling. The fact that fees decrease as less refuse is disposed provides an incentive for waste generators to consider alternatives to disposal. Public education is vital to ensure that residents realize that their initial purchasing decisions constrain their ability to utilize disposal alternatives and thus diminish the amount they pay for waste management services. Concerns regarding implementation include increased risk of illegal dumping.

Criterion #6: The option should equitably distribute the pricing system for waste management services.

Currently, California local governments determine the manner in which refuse collection services are financed within their jurisdictions. Many local governments have opted to use general revenues to finance refuse collection. In terms of equity, this policy is undesirable. Because there is no direct cost associated with using the service, users will tend to overproduce refuse. As a result, small generators subsidize the refuse collection and disposal services of large generators. By making waste generators pay according to the amount of waste they generate, equity is enhanced within the financing component of service provision. Subsidies can be provided to low income generators who would not otherwise be able to absorb the rate increase.

Another equity concern is premised on the incentive to cheat that is built in to unit based disposal pricing. Because residents are charged based on the amount of waste they produce, there is incentive to illegally dispose waste or to dispose waste in a neighbor's container. When cheating occurs the waste generator does not bear the disposal cost; thus, a primary goal of this fee, to internalize disposal cost, is compromised. To the extent that either of these behaviors manifest, there is a negative impact on equity. Enforcement strategies can mitigate the desire to cheat.

X OPTIONS RECOMMENDED FOR FURTHER REVIEW

REVIEW

This Section contains generic fee options suggested for further consideration. These options were selected because they have the most potential to promote market development based on the evaluation criteria established in Section III. Each option has unique pros and cons that should be considered carefully. Upon Board direction, a legislative proposal based on any of the options could be developed within a relatively brief time frame. Developing a specific proposal would involve defining those framework parameters referenced in Section II. These parameters include the fee goal, who pays the fee, what the fee is levied on, and the basis for calculating the fee. Additional analysis of the specific proposal, using the identified evaluation criteria, should be undertaken during the initial stage of program development.

Any of the identified fee options can be crafted to support California secondary materials market development. This is because all fees generate revenues, and the revenues can be dedicated to specific programs including those which enhance postconsumer material demand. If a fee is crafted with the additional intent of influencing behavior, then its impact on market development can be magnified. The design characteristic fee and the advanced disposal-recycling fee are examples of fees that both generate revenue to support market development and modify behavior to the same end. The remaining fees, the mass minimization fee, the deposit surcharge, the gross receipts fee, and unit based disposal pricing, are fees whose market development impacts are limited to providing program funding.

Because all the fees can be crafted to provide funding for market development programs, none are disregarded as inappropriate to consider. However, to maximize potential market development impact, those fees which also modify behavior are most deserving of additional consideration. To this end, further analysis of the design characteristic fee and the advanced disposal-recycling fee follows. The remaining fees, not currently recommended for additional consideration, directly support other IWM goals, such as waste prevention and recycling. It would be appropriate to consider these fees, if waste prevention or recycling opportunities are being pursued.

DESIGN CHARACTERISTIC FEE

As mentioned in Section V, the design characteristic fee can be structured specifically to promote postconsumer materials use. As such, the fee may be more properly identified as a material characteristic fee. To promote postconsumer materials use, this fee would be based on the amount of virgin material content in specified products or packages. This way, manufacturers have an incentive to use postconsumer materials as feedstock for manufacturing their products/packages.

While it is true that there is no guarantee that all additional demand will be experienced in California, it is inevitable that a portion of it will be.

Although no example of a material characteristic fee was discovered through the nationwide survey of state waste management officials (summary in Appendix A), the Florida fee discussed in Section VII does provide an out for products whose packaging contains specified minimum levels of recycled materials. This provision has proved to be extremely popular within the regulated community; Florida officials estimate that eventually between 75 and 80 percent of all packages subject to the fee will become exempt either due to using recycled materials or by attaining a specified recycling rate.

The potential to have a significant positive impact on California secondary materials market development is the primary benefit associated with this fee. Concerns regarding the fee's practical implementation can be minimized by assessing the fee to the distributor, the entity that imports the product/package into the state. This will minimize fee collection points. To ensure that the entities most able to affect postconsumer content levels (i.e., manufacturers through specifications and consumers through purchasing habits) are aware of the fee, the fee structure should include a mandatory pass through provision.

Another benefit of this fee type is that its scope can be very flexible. All products/packages can be subject to the fee; the fee can target particular materials, such as those identified as priority materials in the March 1993 Market Development Plan for California; or the fee can be levied on particular products made from specific materials. While the net economic impact of any fee is unlikely to be positive, potentially negative impacts can be mitigated through redistribution of collected fees.

ADVANCED DISPOSAL-RECYCLING FEE

Although the goal of this fee is to internalize disposal-recycling costs, advanced disposal-recycling fees can support market development when there is fee forgiveness for regulated products/packages that have specified amounts of postconsumer content. All else equal, this will make products/packages that have the requisite amounts of postconsumer content relatively more attractive. This strategy has proved to be successful in Florida. With respect to a similar fee being implemented in California, although there is no guarantee that the full impact of increased demand will be experienced in state, it is likely that California secondary materials markets will enjoy some stimulus.

The fee can be broadly applied to all products/packages or narrowly construed to apply only to specified items. As with the design characteristic fee, assessing the fee to distributors, with a mandatory pass through requirement, will help to streamline program administration.

Determining disposal-recycling costs may be difficult. In Florida the fee level was set arbitrarily and in Germany the fee is intended to cover the cost associated with providing a recyclable collection infrastructure. The complexity of calculating the fee should be balanced with available resources.

APPENDIX A: BACKGROUND RESEARCH

This appendix contains key findings from a literature review and a non-scientific survey of IWM programs adopted or under consideration by various jurisdictions. In addition to a summary of the literature review and survey findings, a copy of the survey is included as is a bibliography that documents the materials consulted for the literature review.

LITERATURE REVIEW

There is a broad range of literature available that addresses fee systems and the range of their configuration. Several types of literature were consulted including documents published by the business community, industry, academia, government, and advocacy groups. Each of these sectors brings a different perspective to its analysis of IWM programs and fee policies. The literature highlights four key issues regarding a fee system's implementation:

- Defining Program Objectives
- Delimiting Program Framework
- Assessing Interaction with Other Programs
- Measuring Program Impacts

The principle ideas and arguments presented in the literature, relevant to each of the four key issues, are summarized in this Appendix.

Defining Program Objectives

The literature identified three primary types of objectives for fee-based systems: financial, environmental, and socio-economic. Financial objectives are those that focus on the potential revenue that can be generated by a fee-based system. Environmental objectives focus on the potential waste prevention and diversion advantages that may be offered by the system. Socio-economic objectives focus on the potential of the fee system to increase awareness of disposal costs and expand interest in using alternative products or materials. All three objectives can be incorporated into a fee structure; however, the program should be designed to rank or prioritize these objectives based on broader IWM goals. If objectives are not prioritized, the result may be a fee that does not send a clear message to the fee payer as to the desired behavior that is intended to be modified. As a result the fee objective may not be realized.

The following articles were the primary information sources for defining program objectives:

- ADF Advisory Committee Progress Report
- Moreland Act Commission on the Returnable Container Act
- ADFs Structure and Implementation

- **Front-End Disposal Fees -- Economic Incentives for Manufacturer Change**

Delimiting Program Framework

Four factors that must be delimited when implementing a fee system are identified and analyzed in Section II, Fee Framework. In determining the program framework for a fee system, jurisdictions must consider a range of variables. These variables include the level of consumer awareness, the primary components of the municipal waste stream, public and private sector implementation costs, and the administrative and economic infrastructure available to support program implementation. Additional variables were identified in the literature.

The following articles were the primary information sources for identifying program factors:

- **The Decline of the Legislator, the Rise of the Regulator; Recent Trends in State Recycling Programs**
- **Variable Fee Systems in Minnesota**
- **Waste Management: Taking the Trash Away**

Assessing Interaction with Other Programs

For successful implementation, the fee program should complement the overall IWM program. For example, unit based disposal pricing for solid waste collection should be accompanied by a reliable, convenient recycling and/or composting program, so that waste generators have a disposal alternative. Without this support, the fee system may fail as consumers look to other, less expensive alternatives to dispose of waste, such as illegal dumping. Because unit based disposal pricing is intended to modify behavior, the fee level must consider the willingness of the consumer to participate in the complete solid waste program. For example, the fee should be high enough to provide an incentive to use the recycling and composting components of the IWM program.

Primary reference articles for information on assessing the interaction of the fee system with other programs are listed below:

- **California - How Can We Get to 50 Percent**
- **AB 2020 Vision Clouded by Controversy**
- **Twenty-Five Funding Mechanisms for Integrated Waste Management Programs: Answers for Communities**

Measuring Program Impacts

There are various means to measure the impacts of a fee system. The type of data used to assess the program impacts will depend on program goals. If the primary objective of the fee is to generate revenue, then the amount of fees collected

would be a way to quantify the program impact. If a fee is intended to effect a behavior, then data concerning recycling rates, postconsumer content levels, or increase in product lifespan would be appropriate indicators. Other information about program impacts can be inferred from this type of data, such as the level of consumer satisfaction with the program, the cost trends for consumers or manufacturers, and other changes in the composition or activities of the regulated community.

Primary reference articles for information on measuring program impacts are listed below:

- League of California Cities Resolution
- Waste Reduction and Packaging in Europe
- Lessons from the Bottle Bill
- National Soft Drink Association's Next Challenge

NATIONWIDE SURVEY

Fee systems exist or have been considered in all regions in the United States. States as diverse as Florida, Maine, New Mexico, Illinois and California have considered or have implemented fees to support IWM and/or secondary materials market development. A Board contractor conducted a nationwide survey of IWM professionals as part of the background on which the analysis and conclusions contained in this report are based. The purpose of the survey was to obtain information regarding existing or proposed fee systems at the state level. Survey questions addressed both general issues, such as legislative history and program evaluation, and specific issues, such as those that comprise the fee framework as outlined in Section II of this document.

A summary of survey results follows, and a copy of the survey, which was mailed to over 25 states, is included in this Appendix following the summary matrix. Due to returned surveys that were not complete, information in the matrix may be incomplete. Additional information obtained from the literature review is integrated into the matrix when appropriate. Written documents that are used to support the survey findings are cited in a complete bibliography that can be found at the conclusion of this Appendix.

SUMMARY OF EXISTING OR PROPOSED FEE SYSTEMS

STATE	FEE GOAL	WHAT IS FEE LEVIED ON?	WHO PAYS THE FEE?	BASIS FOR SETTING THE FEE
DELAWARE	control litter	beverage containers	wholesalers	flat rate per container; level established by manufacturer or distributor, but is not to be less than 5¢
FLORIDA	control litter, promote recycling, develop recycling infrastructure, raise revenues	containers, tires, lead-acid batteries, and newsprint	wholesalers pay container fee; consumers pay tire fee; entity that imports into state (wholesaler) pays lead-acid battery fee; newsprint consumers (publishers) pay newsprint fee	all are flat rates per unit; a rebate is available to offset the front-end fee for newsprint
GEORGIA	decrease in disposed waste; generate revenue for hazardous waste and disposal facility clean-up	tires and disposed solid waste	retailers pay tire fee when tire is sold to "ultimate consumer"; entities that dispose of waste in facilities operated by a city or county pay the disposal fee	tire fee is a flat rate per unit; solid waste disposal fee is a flat rate per ton of refuse disposed; it is set at discretion of city or county, but cannot be less than \$1
ILLINOIS	generate revenue to fund a scrap tire management grant/loan program; provide incentive for retailers to accept the return of used lead-acid batteries	tires and "optional" fee on lead-acid batteries	either retailers or wholesalers can pay the tire fee; retailers may impose a fee on batteries they accept for recycling	tire fee is a flat rate per unit; the lead-acid battery fee is set at retailer's discretion
MAINE	generate revenue to assist localities in establishing and expanding recycling programs	tires; lead-acid batteries; major consumer items (appliances, furniture, bathtubs, and mattresses)	retailers are responsible for collecting all fees at the point of sale	all fees are flat rate per unit
MASSACHUSETTS (proposed-- not enacted or implemented)	encourage source reduction and recycling and generate revenue	waste disposed	waste generators	refuse collection rates would vary depending on the amount of refuse that requires disposal

SUMMARY OF EXISTING OR PROPOSED FEE SYSTEMS

STATE	FEE GOAL	WHAT IS FEE LEVIED ON?	WHO PAYS THE FEE?	BASIS FOR SETTING THE FEE
MICHIGAN	generate revenue to ensure proper tire management and remedy existing problems; reduce litter; increase recycling, defray bottler and distributor costs	tires and specified beverages	when there is a title transfer the person purchasing the vehicle pays a tire fee; retailer pays container deposit to bottler or distributor and the consumer pays deposit to retailer; retailer returns container fee to consumer if container is returned	both fees are flat fees assessed per unit
MICHIGAN, CITY OF LANSING	generate revenue to provide curbside collection service for white goods and bulky goods; decrease illegal dumping of white goods and bulky goods	white goods and bulky items	person that wants to dispose of white good or bulky item purchases sticker (available at retail outlets)	flat fee per white good or bulky good disposed; the initial fee was raised to cover increased program costs
NEBRASKA	permit/annual fees raise revenues to cover administrative costs of regulatory program; disposal fees cover administrative costs and provide grant monies for communities to improve IWM programs; tire, retail business, and litter fees generate revenue to provide communities with grant monies to improve IWM services	landfill permits, landfill operations, refuse disposal, tires, "tangible personal property", and potential litter items (excluding periodicals)	landfill permit and operating fees are paid by landfill owners; disposal fee is paid by refuse haulers; consumers pay the tire fee; tangible personal property fee is paid by retailers; and litter fee is paid by manufacturers, wholesalers, and retailers that produce or sell products that can contribute to litter	the disposal fee is a flat rate per ton of waste disposed; the tire fee is a flat fee per unit purchased; the litter fee is based on the value of gross product sold (about \$150 per entity)
NEW HAMPSHIRE	generate revenue to cover the cost associated with recycling vehicle waste components (e.g., tires, oil, batteries)	optional fee assessed by municipalities on vehicle registration or disposal	person registering or disposing the vehicle	registration surcharge varies depending on type of vehicle and vehicle size
NEW HAMPSHIRE, CITY OF CLAREMONT	generate revenue to cover cost of providing IWM services and education programs; provide waste prevention and recycling incentive	disposed waste	paid by waste hauler and passed on to waste generator	flat rate per ton

SUMMARY OF EXISTING OR PROPOSED FEE SYSTEMS

STATE	FEE GOAL	WHAT IS FEE LEVIED ON?	WHO PAYS THE FEE?	BASIS FOR SETTING THE FEE
NEW HAMPSHIRE, CITY OF DOVER	provide incentive to recycle; decrease property tax burden by funding refuse collection with a user fee	disposed waste (fee is actually levied on the purchase of a bag in which refuse must be disposed)	waste generators	rate varies with volume of bag used to dispose refuse; flat rate for bulky goods that cannot fit in a bag
NEW HAMPSHIRE, CITY OF KEENE (proposed— not enacted or implemented)	provide incentive to recycle, equitably distribute the cost of waste disposal among waste generators, provide a convenient way to dispose/ recycle white goods	disposed waste (fee is actually levied on the purchase of a bag in which refuse must be disposed) and white goods	waste generators	rate would vary with volume of bag used to dispose refuse; flat rate for white good disposal
NEW JERSEY (21 communities have these programs)		disposed waste	waste generators	per container billing
NEW MEXICO	provide incentive for waste prevention and recycling; generate revenue to upgrade and expand disposal facilities	disposed waste with additional surcharge on waste imported from out-of-district	paid by waste haulers and passed on to waste generators	flat rate per ton of waste disposed; out-of-district surcharge to be based on cost to upgrade and expand disposal facilities
NEW YORK	beverage container fee controls litter and internalizes costs; lead-acid battery deposit to encourage return of battery	specified beverage containers and lead-acid batteries	retailer pays beverage container fee and passes cost on to consumer who gets reimbursed if the container is returned; the consumer pays the fee which is returned when the battery is returned for recycling	flat rate per container or battery
NORTH CAROLINA	promote recycling and materials recovery enterprises	recycling equipment	tax exemption for the business involved in the recycling activity	
OHIO, CITY OF MILFORD	waste disposal fee is to provide incentive to prevent and recycle waste; bulky good fee raises revenue to cover the cost of providing collection service	disposed waste and bulky goods	waste generator	flat rate per bag of refuse that requires disposal (1 bag/month provided at no charge); flat rate per bulky good that requires disposal; fees were set through a competitive bid process

SUMMARY OF EXISTING OR PROPOSED FEE SYSTEMS

STATE	FEE GOAL	WHAT IS FEE LEVIED ON?	WHO PAYS THE FEE?	BASIS FOR SETTING THE FEE
VERMONT	generate revenues to fund state waste management and recycling program administration and operation	disposed waste	refuse haulers pass the fee on to waste generators	flat rate per ton of refuse disposed
VIRGINIA	the litter fee generates budget funds for the Virginia Division of Litter Control and Recycling; the tire fee generates revenue to fund programs that manage scrap tires	items, such as packaging, that may become litter and tires	the litter fee is paid by manufacturers, wholesalers, distributors, and retailers involved in the production and sale of specified items; the tire fee is paid by consumers at the time of purchase	the litter fee is a flat rate assessed to each company; entities that sell beverages or groceries pay an additional fee; the tire fee is a flat fee per unit of product sold
VIRGINIA, CITY OF HAMPTON	encourage recycling and generate revenues to fund solid waste management activities within the city	disposed waste	waste generator	households that do not use the recycling program are charged a higher refuse collection fee than households that participate in the recycling program; the original fee was based on the number of bags collected for disposal; in 1994 this fee is to be based on weight of disposed refuse
VIRGINIA, CITY OF POQUOSON	landscaping waste fee generates revenue to fund program, also intended to provide incentive to compost	disposed waste and landscaping wastes	waste generator	flat rate per bag of refuse disposed; \$12 per load of landscaping waste (includes labor, operating, and landfill tip costs)
WASHINGTON	litter fee is intended to generate revenue to fund mandated litter control and recycling programs; lead-acid battery fee is intended to encourage the return of used batteries; tire fee generates revenue to use in pile remediation and market development activities	products and packaging that tend to become litter; lead-acid batteries; tires	litter fee is paid by companies that sell, manufacturer, or distribute specified products or packaging; lead-acid battery fee is paid by consumers when they purchase a battery if a used one is not returned	the litter fee is based on a flat rate per \$1 million of profits; lead-acid battery and tire fees are a flat rate per unit

SUMMARY OF EXISTING OR PROPOSED FEE SYSTEMS				
STATE	FEE GOAL	WHAT IS FEE LEVIED ON?	WHO PAYS THE FEE?	BASIS FOR SETTING THE FEE
WISCONSIN	encourage use of newsprint with recycled content and encourage use of diaper services	newsprint and diaper services	publishers; owners of diaper services	the newsprint fee is based on a percent of the cost to purchase newsprint that does not comply with mandated recycled content levels; diaper services are exempt from sales and use taxes

SURVEY FORM

The Applied Management and Planning Group, in conjunction with Booz-Allen and Hamilton, Inc., was under contract to the Board to conduct research on alternative fee-based incentive systems which will divert waste from landfills and promote recycling in California. As part of this study the contractors surveyed communities and states throughout the US. The information obtained from the survey assisted in the analysis contained in this report. The following is a list of questions that are identical to those that appeared on the survey form sent to waste management officials.

1. What type of fee-based incentive system have you implemented or are you planning to implement?
 - 1) Advanced Disposal Fee: What type?
 - a) Unit Charges
 - b) Variable Unit Charges
 - c) Virgin Materials Levy
 - d) Other:
 - 2) Back-End Fee: What type?
 - a) Deposit/Return System
 - b) User Pay Charges
 - c) Taxes on Waste Management Services
 - d) Tipping Fee Surcharge
 - e) Gross Receipts Taxes
 - f) Other:

3) A system which combines various elements of fee-based incentives.
Please describe:

2. What are the goals of the levy? (Circle all that apply)

- 1) Increase source reduction
- 2) Increase recycling
- 3) Provide funds for waste management programs
- 4) Promote the compatibility of source reduction, recycling, and using recycled materials
- 5) Change consumer behavior
- 6) Change manufacturer behavior
- 7) Other, please specify.

3. Why did you decide to switch to a fee system?

4. What is the levy assessed on (what wastes are covered)?

- 1) Packaging
- 2) Non-durable goods
- 3) Durable goods
- 4) Other

5. Who pays the levy (or will pay)?

- 1) Package Manufacturer
- 2) Product Manufacturer
- 3) Wholesaler
- 4) Retailer
- 5) Consumer
- 6) The First Point of Sale
- 7) Waste Disposers/Landfill Operators

6. At what point is the levy paid (or will be paid)?

7. What is the basis of the assessment?

- 1) Weight
- 2) Volume
- 3) Price

- 4) Per item or container
- 5) Scrap value

8. How is the base fee calculated?

9. What items go into the fee calculation? Is it merely environmental costs or are other program costs factored in?

10. Are there fee exemptions for products with recycled content, or for products which are recyclable. (What is the level of recycled content you require for exemption? What are the guidelines to identify products that are exempt?)

11. Who collects the fee (or will collect)?

12. Who controls/manages the money (or will control)?

13. How is the money spent (or how will it be spent)?

14. Does or will the mechanism restrict interstate commerce, or put in-state manufacturers at a disadvantage?

For Entities with Existing Systems:

15. Has the system resulted in unintended consequences (such as promoting illegal dumping or putting in-state manufacturers at a disadvantage due to the point of the levy)? Could you please describe the consequences.

16. Do you have any evidence that the system has promoted behavior change among manufacturers regarding the types of materials they use in packaging or the way they package products?

17. Do you have any evidence that the system has promoted behavior change among consumers regarding the products they buy? Is the fee, or the reason for the higher price, visible to the consumer in order that the consumer has the power to make purchasing decisions which account for solid waste impacts?

18. Has the incentive system increased source reduction? What evidence do you have?

19. Has the incentive system promoted recycling and the use of recycled materials? What evidence do you have?
20. Are there any other impacts which you have observed?
21. What tools are incorporated into the system to monitor and assess its effectiveness in the above mentioned areas?
22. In your opinion has the fee-based incentive system been implemented efficiently?
23. Does the legislation governing this fee match what has been implemented? What are the differences and why? Can we get copies of the legislation?

For All Respondents:

24. Were any other fee systems proposed before this system was adopted or proposed? What were the other proposals?
25. What did the government agency have to go through to get to the point of implementation (or this far in the planning process)?
26. How did you address the concerns of all of the "players" involved?
27. Is the system equitable to all paying the fee?
28. What are the strengths of your fee-based incentive system?
29. What are the weaknesses of your fee-based incentive system?
30. Is there any additional information you have on the program that would be useful to this survey? Any data or reports which you could make available to us?
31. Are you aware of any other communities which have implemented or are planning to implement fee-based systems? Who could we contact to discuss these systems?

BIBLIOGRAPHY

DOCUMENT TITLE	AUTHOR	DATE	SYNOPSIS
A Report on Advance Disposal Fees	Arthur D. Little, Inc.	1991	Discusses point of levy; levy basis; incentive analysis; an appendix with a list of bills from various states; matrix of each state's efforts in the area of ADF's
AB 2020 Vision Clouded by Controversy	Jim McMahon, <i>Resource Recycling</i>	10/92	Discusses proponents' and opponents' views concerning ADF on containers. Provides chart of the uses to which deposits are put.
ADF - Are They an Effective Tool for Source Reduction?	Dave Smith, Booz - Allen	7/92	Discusses how an ADF is calculated; policy decisions.
ADF Advisory Committee Final Report and Recommendations	State of Florida	11/91	Summarizes recommendations to the State Senate regarding proposed changes to the legislated ADF program concept.
ADF Advisory Committee Progress Report	State of Florida	6/91	Provides an update on the status of the Florida's ADF.
ADF Advisory Committee Progress Report	State of Florida	9/91	Provides an update on the status of the Florida's ADF.
ADF Battle in Florida	Russell H. Martin, <i>BioCycle</i>	11/92	Discusses the Florida ADF on containers.
ADF Talk: CRRRA Conference		8/91	Discusses the goals of an ADF; the processing fee model; ADFs vs. tipping fees; ADF revenues.
ADFs: Structure and Implementation	ADF Project Team	2/92	Discusses the findings of the Tellus Report; summarizes the stated goals from the Board letter; graphic of ADF goals hierarchy; analysis of gaps in AB 2213; key issues related to sources of ADF funds; financial information.
ADFs: The Building Blocks or Wrecking Balls for Private Sector Involvement in Solid Waste Management	Kymerlee F. Estis, Booz - Allen, and Russell H. Martin, State of Florida	12/91	Provides an overview of the design of three proposed ADF programs in terms of the impact of proposed legislation on private sector participation and environmental goals.
Beverage Container Recycling: The California Experience	Kymerlee F. Estis, Booz - Allen, and Ralph E. Chandler, State of California	12/90	Reviews objectives and components of AB 2020 based on interviews with program participants.
Bottle Bother	The Economist	8/90	Discusses issues surrounding recycling of plastic bottles. Summarizes alternative manufacturing processes; outlines economic incentives and pressures for plastics industry.

DOCUMENT TITLE	AUTHOR	DATE	SYNOPSIS
Bottles to Walls	Jerry Powell, <i>Beverage World</i>	8/90	Focuses on glass bottle recycling industries, with summary of challenges facing industry. Discusses commingled collection programs, contamination of scrap glass, limited capacity of local plants, and potential export markets.
Calculating the Real Cost of Recycling	Lynn K. Croy, <i>Waste World</i>	7/92	Describes factors a community should consider and evaluate before initiating a recycling program.
California - How Can We Get to 50 Percent?	Linda Morse, <i>Public Management</i>	10/91	Discusses AB 939 mandate and what local and state IWM programs must take into account to reach a 50% diversion rate.
California Manufacturers' Association Memo	California Manufacturers' Association	12/92	Discusses their reasons for opposing the League of California Cities' ADF proposal.
City's Automated Collection Stands the Test of Time	Susan DeGuane, <i>World Wastes</i>	7/92	Discusses how automating has reduced worker injuries and related costs.
CIWMB Briefing	Resource Integration System	11/91	Discusses all aspects of an ADF: behavior change, front-end, voluntary vs. mandatory, and comparison between CA, FL, MA, and Germany.
Comparative Economics of Alternative Approaches to Solid Waste Management	Francis Mulvey, New York State Legislature, Economic Studies Division	undated	Evaluates alternative methods of waste disposal and focuses on the economic, environmental, and health risk aspects of different strategies.
Creating a Sustainable Recycling Economy	Susan Kinsella, <i>Californians Against Waste</i>	9/91	Discusses the recycling cycle; ADF's market development benefits and costs; addresses some ADF criticisms.
Credits May Stimulate Sluggish Markets	Stephen Zavestoski, <i>Waste Age</i>	9/92	Discusses the option of instituting recycling credits to stimulate markets.
Criteria for Evaluating Market Structure Policy Options	Recycling Advisory Committee Meeting Notes	12/92	Lists six criteria to evaluate market structure policy options developed by the RAC.
Defining Recyclability	Stephen Barlas, <i>Beverage World</i>	11/91	Discusses EPA proposals for minimum recycled content as related to beverage containers; presents alternative proposals and industry viewpoint.
Disposal Cost Fee Study	Tellus Institute	2/91	Discusses disposal cost analysis performed for the Board.
Financial Mechanisms to Support Waste Management Systems	Resource Integration System	11/91	Discusses evaluation criteria and various funding options.
Financing Strategies for Integrated Waste Management Programs: Answers for Communities	Melissa Miller-Henson, et al, Local Government Commission	5/92	A guide intended to aid local governments in evaluating funding options to implement AB 939.
Front-end Disposal Fees - Economic Incentives for Manufacturer Change	Karin Endy, New York Regional Plan Association	9/91	Discusses goals of ADF; revenue; methodology; Tellus Report; AB 2213; Florida program; Federal legislation; legislation in Tri-State area; bibliography.

DOCUMENT TITLE	AUTHOR	DATE	SYNOPSIS
House May Mandate Use of Used PET	Stephen Barlas, <i>Beverage World</i>	9/91	Discusses federal legislation to require plastic bottles to contain recycled PET and HDPE. Also discusses provisions of the proposed National Recycling Markets Act.
League of California Cities Resolution	League of California Cities, General Assembly	11/92	Discusses the League's support for a "recycling incentive fee" to provide a market-based signal to manufacturers, thus promoting packaging and household hazardous waste reduction and increased recycled content.
Lessons from the Bottle Bill	Bill Shireman, <i>Beverage World</i>	10/92	Reviews the evolution of consumer attitudes toward natural resources and discusses the evolution of beverage packaging into resource-efficient forms.
Minutes from CRRA Meeting and AB 2213 Text	California Resource Recovery Association	2/91	Discusses meeting at which Assemblyman Sher spoke; lists four key questions that must be answered when considering an ADF; limited discussion of AB 2213.
Moreland Act Commission on the Returnable Container Act	Moreland Act Commission to Investigate the Operation and Administration of the New York Returnable Container Act	3/90	Discusses the Act's effectiveness including the adequacy of enforcement and costs to comply, and makes recommendations for improved program efficiency.
National Soft Drink Associations Next Challenge	Greg Prince, <i>Beverage World</i>	10/91	Outlines issues associated with RCRA; discusses packaging bans, mandatory recycled content, minimum recycling rates, market development, and collection systems.
Plastics Recycling in Taiwan	Eugene Chien, <i>Harvard Business Review</i>	9/91	Summarizes Taiwan's environmental policy and the Solid Waste Management Act of 1988. Includes policy specifics and program goals.
Renewable Interest: Bottle Resins are Gearing Their Competitive Edge Toward Heavy Market Demand for Recyclability	Alice Naude, <i>Chemical Marketing Reported</i>	4/91	Discusses recyclability as a consideration for raw material selection.
Conceptual Plan to Implement the Rigid Plastic Packaging Container Act	Ernst & Young, for the California Integrated Waste Management Board	12/92	Provides a theoretical framework to implement the plan.
State Litter-Recycling Laws	<i>Beverage World</i>	'92-'93	Summarizes state laws that address litter control and prevention and the administration of recycling and public awareness programs.
Survey of State Funding for Solid Waste Management Programs	New York State Department of Environmental Conservation	9/91	Contains the findings from a funding survey sent to 48 contiguous states; outlines trends and variations from previous research.
Taxing the Solid Waste Stream	Matthew Montavon, <i>Waste World</i>	10/90	Outlines different types of waste taxes and how they are implemented.

DOCUMENT TITLE	AUTHOR	DATE	SYNOPSIS
The 1992 Information Please - Environment Almanac	World Resources Institute	1992	Provides a broad overview of the status of solid waste management in the US; contains statistical data in chart form.
The Decline of the Legislator, the Rise of the Regulator: Recent Trends in State Recycling Programs	Jerry Powell, <i>Beverage World</i>	10/92	Lists recent state legislation regarding recycling or waste management.
The Latest Recycling Issues	Jerry Powell, <i>Beverage World</i>	7/90	Discusses proposed legislation for mandatory recycled content; presents key economic effects and potential challenges; focuses on beverage industry.
The State of Garbage in America, Part I	Jim Glenn, <i>BioCycle</i>	4/92	A 1991 survey of solid waste management officials about waste generation, methods of disposal, disposal capacity, curbside recycling, yard waste composting, etc.
Twenty-Five Funding Mechanisms for Municipal Recycling Programs	Barclay Hudson, EcoSource International	11/90	Looks at 25 different ways for cities to fund recycling programs.
Variable Fee Systems in Minnesota	Susan Schmidt and Dan Krivit, <i>BioCycle</i>	9/92	Discusses issue of whether licensing authorities provide added incentives for waste reduction and recycling while generating sufficient revenues and rate equity.
Waste Management - Taxing the Trash Away	Frank Ackerman, <i>Environment</i>	6/92	Discusses the Tellus Report; points out several environmental factors that need to be taken into consideration; conventional monetary costs vs. non-conventional environmental costs.
Waste Reduction and Packaging in Europe	James E. McCarthy, <i>Resource Recycling</i>	7/91	Discusses the effects of the packaging legislation in Germany and Europe.
Yes, In Their Backyard and Everybody Else's	Greg Prince, <i>Beverage World</i>	6/90	Summarizes viewpoints of officials of major packaging groups convened at a conference to discuss their firms' roles in resolving the solid waste crisis. Discusses "green market" consumer preferences and legislative trends.

APPENDIX B: ANALYSIS OF POTENTIAL FEE PAYERS

An examination of product lifecycle produced a list of potential fee payers. It was determined that a potential fee payer existed at any point where a product's feedstock, the actual product, or a product's by-product changed hands. However, because different fee payers have control over different aspects of a product, it may be more appropriate for a particular type of entity to pay the fee. The following matrix, Analysis of Potential Fee Payers, illustrates the range of potential fee payers and identifies the relevant activities in which they are engaged. The factors that motivate their behavior are identified, and based on these factors, a list of desired behaviors was developed and the fee options that could motivate those behaviors were identified.

The use of cost versus price in the context of this matrix should be clarified to prevent confusion. Cost is the cost to the potential fee payer to provide the service/product in question. Price refers to the compensation the potential fee payer receives for providing the service/product. Also, the term "mfr" as used in the matrix is an abbreviation for the word manufacturer, and the term "spec's" is an abbreviation for the word specifications.

Analysis of Potential Fee Payers

POTENTIAL FEE PAYER	RELEVANT ACTIVITIES	MOTIVATING FACTORS	DESIRED OUTCOME	FEE OPTIONS TO ENCOURAGE BEHAVIOR
RAW MATERIAL PRODUCER	<ul style="list-style-type: none"> provide industrial feedstock 	<ul style="list-style-type: none"> customer demand customer spec's cost versus price government regulation state of technology 	<ul style="list-style-type: none"> increase demand for postconsumer materials make decisions based on true cost 	<ul style="list-style-type: none"> design characteristic fee
PACKAGE MANUFACTURER	<ul style="list-style-type: none"> purchase packaging raw materials invest in technology to mfr packaging mfr packaging determine shipping packaging sell packaging to product manufacturer and distributors 	<ul style="list-style-type: none"> customer demand customer spec's cost versus price material availability & quality government regulation state of technology 	<ul style="list-style-type: none"> research and development increase postconsumer materials use in packaging design packaging that is recyclable, reusable, durable and/or waste preventive make decisions based on true cost 	<ul style="list-style-type: none"> mass minimization fee design characteristic fee advanced disposal-recycling fee gross receipts fee

POTENTIAL FEE PAYER	RELEVANT ACTIVITIES	MOTIVATING FACTORS	DESIRED OUTCOME	FEE OPTIONS TO ENCOURAGE BEHAVIOR
PRODUCT MANUFACTURER	<ul style="list-style-type: none"> ● set package spec's ● set product spec's ● invest in technology to mfr product ● purchase product raw materials ● mfr product ● purchase packaging (including shipping packaging) ● set product price ● market product ● sell product to distributors, wholesalers, and retailers 	<ul style="list-style-type: none"> ● customer demand (for product and packaging) ● cost versus price ● material availability and quality ● government regulations ● state of technology 	<ul style="list-style-type: none"> ● research and development ● increase postconsumer materials use in packaging and products ● design packaging and products that are recyclable, reusable, durable and/or waste preventive ● educate consumers to purchase products and packaging that meet the above criteria ● make decisions based on true cost 	<ul style="list-style-type: none"> ● mass minimization fee ● design characteristic fee ● advanced disposal-recycling fee ● gross receipts fee
DISTRIBUTOR/IMPORTER/WHOLESALE	<ul style="list-style-type: none"> ● purchase products from product manufacturers ● purchase packaging to repackage products ● repackage products ● act as intermediary between product manufacturer and retailer ● sell product to other distributors or retail outlets 	<ul style="list-style-type: none"> ● customer demand ● cost versus price ● product availability and quality ● government regulation 	<ul style="list-style-type: none"> ● stock products that have postconsumer content or are recyclable, reusable, durable or waste preventive ● stock products that are packaged in the above manner ● when repackaging products, do so in the above manner 	<ul style="list-style-type: none"> ● mass minimization fee ● design characteristic fee ● advanced disposal-recycling fee ● deposit surcharge ● gross receipts fee
RETAILER	<ul style="list-style-type: none"> ● purchase products ● set product price ● make display decisions ● market product ● sell product to consumer 	<ul style="list-style-type: none"> ● customer demand ● cost versus price ● availability and quality ● government regulation ● shelf space considerations 	<ul style="list-style-type: none"> ● stock products that have postconsumer content or are recyclable, reusable, durable or waste preventive ● stock products that are packaged in the above manner ● educate consumers to purchase products and packaging that meet the above criteria 	<ul style="list-style-type: none"> ● mass minimization fee ● design characteristic fee ● advanced disposal-recycling fee ● deposit surcharge ● gross receipts fee
CONSUMER	<ul style="list-style-type: none"> ● purchase products 	<ul style="list-style-type: none"> ● price ● availability and quality ● environmental awareness ● product marketing ● convenience of use ● brand loyalty ● government regulation 	<ul style="list-style-type: none"> ● purchase products that have postconsumer content or are recyclable, reusable, durable or waste preventive ● purchase products that are packaged in the above manner ● make decisions based on true cost 	<ul style="list-style-type: none"> ● mass minimization fee ● design characteristic fee ● advanced disposal-recycling fee

POTENTIAL FEE PAYER	RELEVANT ACTIVITIES	MOTIVATING FACTORS	DESIRED OUTCOME	FEE OPTIONS TO ENCOURAGE BEHAVIOR
WASTE GENERATORS	<ul style="list-style-type: none"> dispose products, packaging, and production by-products recycle or reuse products, packaging, and production by-products purchase refuse hauling services 	<ul style="list-style-type: none"> convenience of diversion program price received for recycled materials disposal cost government regulation environmental awareness have space that can be dedicated to storing recyclables 	<ul style="list-style-type: none"> use existing diversion opportunities establish waste prevention and recycling programs 	<ul style="list-style-type: none"> unit based disposal pricing
REFUSE HAULERS	<ul style="list-style-type: none"> provide refuse collection services to waste generators (may be contracted through a third party, such as a municipality) transport refuse to MRF or landfill operate recycling programs (see recyclers) 	<ul style="list-style-type: none"> existing contracts government regulation collection cost MRF/landfill tip fee transportation cost other operating costs fixed capital investment 	<ul style="list-style-type: none"> implement recycling programs minimize the amount of refuse that is disposed 	<ul style="list-style-type: none"> unit based disposal pricing
RECYCLERS	<ul style="list-style-type: none"> provide recyclable collection services to waste generators (may be contracted through a third party, such as a municipality) transport recyclables sell recyclables to processors, MRF operators, and/or postconsumer material marketers dispose of materials that cannot be marketed 	<ul style="list-style-type: none"> existing contracts government regulation collection cost transportation cost MRF/landfill tip fee other operating costs fixed capital investment price received for materials 	<ul style="list-style-type: none"> expand existing programs to include more material types implement new recycling programs minimize the amount of materials that require disposal 	
MRF OPERATORS	<ul style="list-style-type: none"> obtain materials to use as feedstock for their operations sort mixed waste and recyclables to recover recyclable portion sell materials to postconsumer materials marketers and/or product and packaging manufacturers dispose of materials that cannot be recovered or marketed may provide same activities as refuse haulers, recyclers, and processors 	<ul style="list-style-type: none"> existing contracts government regulation operating costs fixed capital investment landfill tipping fee price received for materials 	<ul style="list-style-type: none"> expand the type of materials that are sorted for recycling minimize the amount of materials that require disposal 	

POTENTIAL FEE PAYER	RELEVANT ACTIVITIES	MOTIVATING FACTORS	DESIRED OUTCOME	FEE OPTIONS TO ENCOURAGE BEHAVIOR
PROCESSORS	<ul style="list-style-type: none"> • purchase materials from recyclers and MRF operators • perform value adding activities such as cleaning and baling • sell materials to secondary materials marketers or directly to product or packaging manufacturers • dispose of materials that cannot be marketed 	<ul style="list-style-type: none"> • cost to obtain materials • government regulation • price received for materials • fixed capital investment • operating costs 	<ul style="list-style-type: none"> • expand the quantity and type of materials they process • minimize the amount of materials that require disposal 	
POSTCONSUMER MATERIALS MARKETERS	<ul style="list-style-type: none"> • purchase materials from recyclers, MRF operators, and processors • sell materials to product or packaging manufacturers • dispose of materials that cannot be marketed 	<ul style="list-style-type: none"> • cost to obtain materials • government regulation • price received for materials • export markets 	<ul style="list-style-type: none"> • expand the quantity and type of materials they market • minimize the amount of materials that require disposal 	
LANDFILL OPERATORS	<ul style="list-style-type: none"> • accept refuse for disposal for a fee • may perform same activities as refuse haulers, recyclers, MRF operators, processors, and postconsumer materials marketers. 	<ul style="list-style-type: none"> • government regulation • operating costs • fixed capital investment 	<ul style="list-style-type: none"> • divert recyclables 	