Attachment 1

Emerging Market Development Options
Summary Report

Analysis of Emerging Market Development Options
Report #1

REVISED DRAFT

Prepared by Planning and Analysis Office
California Integrated Waste Management Board
November 1993

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

This **Summary Report**, considered Report #1, was 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,**[1] the analysis was undertaken to better understand several policy options and issues concerning recycling market development in California.

Four additional Board reports were prepared as part of this project:

Report #2 ***Manufacturer Responsibility Options to Support Integrated Waste Management***, prepared by Board Staff, with contractual assistance by Resource Integration Systems, Ltd., and California Futures, Inc.

Report #3 ***Fee System Options to Support Integrated Waste Management***, prepared by Booz-Allen & Hamilton, Inc. (In progress)

Report #4 ***Tradable Credit Applications to Integrated Waste Management***, prepared by Board Staff.

Report #5 ***Emerging Issues: Global Agreements***, prepared by Board Staff.

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

Acknowledgements

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California Futures, Inc.	(Analysis of Manufacturer Responsibility Options)
Resource Integration Systems, Inc.	(Analysis of Manufacturer Responsibility Options)

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1. Introduction

BACKGROUND

This **Summary Report** synthesizes the findings of Board Staff's analysis of emerging market development options. As outlined in Chapter III of **Meeting the Challenge: A Market Development Plan for California**, the analysis was undertaken to evaluate several potential market development policies, which are complex, broad in scope, and often misunderstood. The term "emerging market development options" was coined to refer to the complete range of fee and manufacturer responsibility policies. In the interest of supporting the waste diversion goals established by the California Integrated Waste Management Act (AB 939), emphasis is placed on secondary (i.e., postconsumer) materials markets. Another study of environmental labeling policy options will be completed in late 1993.

Fee systems include any policy that imposes a surcharge to support integrated waste management efforts. This includes "back-end" schemes levied directly on waste generators, such as landfill fees, as well as "front-end" fees, such as California's processing fee and other variations of "advanced disposal fees."

Manufacturer responsibility options are defined broadly to include any policy that requires manufacturers to assume some degree of responsibility for waste management. This includes policies that address demand for secondary materials, such as recycled content and utilization rate requirements, and policies that affect the supply of secondary materials, such as the German model that assigns direct responsibility to industry for achieving diversion targets or the Canadian proposal that would require industry-operated funding organizations to help support collection and market development efforts.

Tradable credits are a tool that provides a market-based mechanism to facilitate compliance with traditional command and control regulations. The purpose of including a tradable credit component are that credit trading allows industry more flexibility in meeting the mandate and it can decrease overall compliance costs. Staff identified three potential applications of tradable credits: minimum content requirements, utilization rate requirements and local diversion goals.

This **Summary Report** is based on the findings of the four reports listed in the foreword. The findings presented in this summary are fully documented in these background reports. In addition, the analysis draws heavily from several other Board activities, including:

> ***Emerging Market Development Options Workshop***, held before the Market Development Committee on April 20, 1993, in Sacramento.

Cost-Benefit Analysis of Six Market Development Policy Options, prepared by California Futures, Inc., and presented to the Market Development Committee on May 12, 1993.

Market Status Reports for Each Major Secondary Material Type, prepared by Board Staff and supported by public workshops conducted in 1992 between September and December.

Conceptual Plan to Implement the Rigid Plastic Packaging Container Act, prepared by Ernst & Young, Inc., and adopted by the Board in July 1993.

PROJECT GOALS

This analysis of emerging market development options has two primary goals: 1) provide a framework to assist the Board in responding to and evaluating state and federal legislative proposals; and, 2) provide the Board with sufficient information to develop its own proposals, should it chose to do so.

While fee legislation has not yet been enacted in California or at the federal level, manufacturer responsibility legislation has been enacted in California and discussed at the federal level.[2] Both issues continue to be subject to much debate. Should additional legislation be proposed in the future, Board staff can use the background analyses and evaluation criteria developed in this study to evaluate the proposals. In addition, should the Board consider developing its own manufacturer responsibility or fee proposals, the study team identified a short list of options that have the highest potential to achieve the evaluation criteria and fulfill market development goals.

REPORT ORGANIZATION

Section 2 presents the results of possible scenarios for achieving California's 25% and 50% waste diversion goals. The scenarios are based on feasible diversion projections on a material-by-material basis. The exercise demonstrates the challenge of meeting the diversion goals and illustrates the priority that must be given to market development policy decisions.

Section 3 presents the criteria used in this study to evaluate and screen manufacturer responsibility and fee options. The criteria are intended to represent the key issues of importance to the Board in evaluating the merits of specific proposals. The evaluation criteria can be used to differentiate between those proposals that merit additional consideration and those that do not further California's market development goals.

Section 4 discusses several evaluation issues which are common to most fee and manufacturer responsibility options. These issues are broader and often conceptual in nature when compared to the criteria established in Section 3.

Sections 5 consists of a summary of Board staff research to date. It presents a brief summary of the theoretical range of fee options. The range of options is distinguished depending on whether the fee being reviewed is a front or back-end fee.

Section 6 summarizes the key findings of the background reports on manufacturer responsibility options. This report was drafted by Board staff and is available on request by contacting the Board at (916) 255-2195.

Section 7 lists options recommended for additional consideration should the Board wish to pursue a market development proposal. Under Board direction, such a proposal could be developed in a brief time frame.

Appendix 1 identifies the potential for the analyzed options to serve as policy tools that contribute to achieving other Board goals, including waste prevention.

Appendix 2 provides a detailed explanation of the methodology used to obtain the waste generation and diversion estimates in Section 2.

Appendix 3 summarizes the general methodology for a cost-benefits analysis of six market development policies, including utilization rates and several minimum content policies. The summarized report was completed under contract for the Board and is available on request by contacting the Board at (916) 255-2195.

Appendix 4 contains a summary of Report #4 in this Emerging Market Development Options Series. The report was completed by Board staff, is titled "Tradable Credit Applications to Integrated Waste Management," and is available on request by contacting the Board at (916) 255-2195.

Appendix 5 summarizes Report #5 in this Emerging Market Development Options Series. The report was completed by Board staff, is titled "Emerging Issues: Global Agreements," and is available by contacting the Board at (916) 255-2195.

2. Achieving California's Waste Diversion Goals

AN APPROACH TO UNDERSTANDING THE CHALLENGE

To better understand the market development challenge that California faces, staff investigated a range of possible material-specific diversion rates that achieve the statewide diversion goals of 25% in 1995 and 50% in 2000. Despite the lack of reliable baseline data and projections, the effort proved valuable and several general conclusions could be drawn. A detailed explanation of the methodology and assumptions employed is provided in Appendix 2. Staff undertook the following general approach:

1) Waste generation estimates for 1990, 1995 and 2000 were developed. Estimates were based on a combination of Board, contractor, and industry data sources. In California, the term "Municipal Solid Waste" includes waste from the residential, commercial, and industrial sectors.

2) A computer spreadsheet model was developed to calculate the overall diversion rate resulting from input source reduction, recycling, and composting rates for each material.

3) Diversion rates for 1995 are based on published projections and staff estimates of likely trends. Staff estimated diversion rates represent their estimate of the most plausible path to 25% diversion.

4) To develop a 50% diversion scenario, diversion rates were input for the year 2000. First, 50% diversion rates were assigned to each of the broad categories of paper, plastics, glass and metals. The 50% diversion rate was then allocated among specific material types within each broad category. This allocation was performed based on staff's understanding of the relative feasibility of diverting each material type. Diversion rates were then input for the remaining materials in the waste stream, including organics and "other" waste, based on staff's qualitative assessment of the feasibility of diverting each waste type.

SCENARIOS FOR ACHIEVING 25% AND 50% WASTE DIVERSION

Tables 1 through 3 summarize the baseline generation and diversion estimates and provide examples of scenarios for achieving 25% and 50% waste diversion. Although the 1995 and 2000 scenarios are, to some extent, arbitrary and the goals could be achieved under other scenarios, the exercise shows by material type the general magnitude of increased diversion that is required to meet established goals. In addition, it is apparent that while a 25% diversion rate is achievable using a number of different combinations, the scenarios under which 50% diversion can be achieved are more limited. Almost any successful 50% diversion scenario involves very high diversion rates for organics, most paper grades, and inerts.

Table 1 1990 Baseline Generation and Diversion

	Generation (M tons)	% of Total Generation	% of Material Diverted	% of Total Wast Stream Diverted
Corrugated	4.54	10.4	34	3.5
Newsprint	2.65	6.1	29	1.8
Computer Print Out	0.41	0.9	24	0.2
Hi-Grade Ledger	0.68	1.5	27	0.4
Mixed Office Paper	0.89	2.0	27	0.6
Mixed Paper	4.82	11.0	3	0.4
TOTAL PAPER	**13.99**	**32.0**	**22**	**6.9**
HDPE	0.29	0.7	6	0.0
PETE	0.09	0.2	18	0.0
Film Plastics	0.85	1.9	2	0.0
Other Plastics	1.48	3.4	2	0.1
TOTAL PLASTICS	**2.71**	**6.2**	**3**	**0.2**
Glass Containers	1.52	3.5	34	1.2
Other Glass	0.36	0.8	11	0.1
TOTAL GLASS	**1.88**	**4.3**	**29**	**1.3**
Aluminum Cans	0.25	0.6	58	0.3
Bi-Metal Containers	0.06	0.1	25	0.0
Municipal Ferrous	1.00	2.3	2	0.0
Tin Cans	0.30	0.7	0	0.0
Non-Ferrous Scrap	0.18	0.4	0	0.0
White Goods	0.17	0.4	0	0.0
Other Metals	0.15	0.3	0	0.0
TOTAL METALS	**2.11**	**4.8**	**8**	**0.4**
Yard Waste	6.05	13.8	8	1.2
Food Waste	3.23	7.4	12	0.9
Wood Waste	3.79	8.7	12	1.0
Misc. Organics	0.91	2.1	3	0.1
TOTAL ORGANICS	**13.99**	**32.0**	**10**	**3.1**
Tires & Rubber	0.49	1.1	10	0.1
Textiles and Leather	0.99	2.3	6	0.1
Inert Solids	3.38	7.7	0	0.0
Other & Unsorted	2.46	5.6	3	0.2
All Other Materials	1.79	4.1	8	0.3
TOTAL "OTHER"	**9.11**	**20.8**	**3**	**0.7**
TOTALS	**43.77**	**100.0**	**N/A**	**12.6**

Table 2 One Scenario for Achieving 25% Waste Diversion by 1995

	Generation (M tons)	% of Total Generation	% of Material Diverted	% of Total Wast Stream Diverted
Corrugated	4.98	10.2	38	3.9
Newsprint	2.89	5.9	31	1.8
Computer Print Out	0.46	0.9	26	0.2
Hi-Grade Ledger	0.76	1.6	29	0.5
Mixed Office Paper	0.98	2.0	31	0.6
Mixed Paper	5.43	11.2	5	0.6
TOTAL PAPER	**15.49**	**31.9**	**24**	**7.6**
HDPE	0.34	0.7	25	0.2
PETE	0.10	0.2	50	0.1
Film Plastics	0.99	2.0	9	0.2
Other Plastics	1.71	3.5	9	0.3
TOTAL PLASTICS	**3.14**	**6.5**	**12**	**0.8**
Glass Containers	1.48	3.0	45	1.4
Other Glass	0.42	0.9	9	0.1
TOTAL GLASS	**1.89**	**3.9**	**37**	**1.5**
Aluminum Cans	0.29	0.6	94	0.6
Bi-Metal Containers	0.07	0.2	58	0.1
Municipal Ferrous	1.04	2.1	10	0.2
Tin Cans	0.30	0.6	58	0.4
Non-Ferrous Scrap	0.20	0.4	5	0.0
White Goods	0.18	0.4	85	0.3
Other Metals	0.18	0.4	0	0.0
TOTAL METALS	**2.25**	**4.6**	**33**	**1.5**
Yard Waste	7.02	14.4	39	5.7
Food Waste	3.75	7.7	21	1.6
Wood Waste	4.40	9.0	30	2.7
Misc. Organics	1.06	2.2	2	0.0
TOTAL ORGANICS	**16.21**	**33.4**	**30**	**10.1**
Tires & Rubber	0.57	1.2	58	0.7
Textiles and Leather	1.15	2.4	5	0.1
Inert Solids	3.92	8.1	40	3.2
Other & Unsorted	2.85	5.9	3	0.2
All Other Materials	2.07	4.3	7	0.3
TOTAL "OTHER"	**10.56**	**21.7**	**21**	**4.5**
TOTALS	**49.55**	**100.0**	**N/A**	**25.4**

Table 3 One Scenario for Achieving 50% Waste Diversion by 2000

	Generation (M tons)	% of Total Generation	% of Material Diverted	% of Total Wast Stream Diverted
Corrugated	5.38	10.3	65	6.5
Newsprint	3.09	5.9	60	3.5
Computer Print Out	0.49	0.9	50	0.5
Hi-Grade Ledger	0.85	1.6	50	0.8
Mixed Office Paper	1.06	2.0	50	1.0
Mixed Paper	5.90	11.3	33	3.7
TOTAL PAPER	**16.78**	**32.0**	**50**	**15.9**
HDPE	0.37	0.7	80	0.6
PETE	0.11	0.2	70	0.1
Film Plastics	1.07	2.0	60	1.2
Other Plastics	1.86	3.5	38	1.3
TOTAL PLASTICS	**3.40**	**6.5**	**50**	**3.2**
Glass Containers	1.44	2.7	54	1.4
Other Glass	0.45	0.9	45	0.4
TOTAL GLASS	**1.89**	**3.6**	**50**	**1.8**
Aluminum Cans	0.31	0.6	94	0.6
Bi-Metal Containers	0.08	0.2	66	0.1
Municipal Ferrous	1.73	3.2	12	0.4
Tin Cans	0.30	0.6	66	0.4
Non-Ferrous Scrap	0.21	0.4	10	0.0
White Goods	0.19	0.4	90	0.3
Other Metals	0.19	0.4	0	0.0
TOTAL METALS	**3.02**	**5.7**	**50**	**1.8**
Yard Waste	7.60	14.5	80	11.3
Food Waste	4.06	7.7	42	3.2
Wood Waste	4.76	9.1	55	4.9
Misc. Organics	1.15	2.2	2	0.0
TOTAL ORGANICS	**17.56**	**33.5**	**58**	**19.5**
Tires & Rubber	0.62	1.2	97	1.1
Textiles and Leather	1.25	2.4	5	0.1
Inert Solids	4.25	8.1	80	6.5
Other & Unsorted	3.09	5.9	2	0.1
All Other Materials	2.19	4.2	6	0.3
TOTAL "OTHER"	**11.39**	**21.7**	**37**	**8.1**
TOTALS	**54.03**	**100.0**	**N/A**	**50.0**

MARKET DEVELOPMENT OBSERVATIONS BASED ON THE SCENARIOS

A number of important observations follow from consideration of the baseline estimates and scenarios for achieving waste diversion goals. These observations are as follows:

Priority Market Development Materials

Because some waste types have little potential for high diversion rates, it will be necessary for other material types to reach diversion rates in excess of 50%. Staff analysis of generation data and hypothetical diversion scenarios indicate the material types on which the Board should focus its market development efforts to assist local jurisdictions in achieving statewide diversion goals. For example, the scenario depicted in Table 3 lists an 80% diversion rate for yard waste, 65% diversion rate for corrugated containers, and 80% diversion rate for inerts.

This analysis provides further justification for the Board's selection of organics and mixed waste paper as priority market development materials. In 1990 these two components represented 45% of the state's waste stream.[3] HDPE and mixed plastics, the Board's other priority materials, are less significant when viewed strictly from the perspective of meeting the statewide diversion goals, but still remain problematic materials for local jurisdictions to divert economically. Diversion from another category, "inerts, which include items such as concrete and soil, will prove integral to achieve the statewide diversion goals. Inerts are an attractive candidate for market development efforts because they represent a significant portion of the waste stream, 8.1%, and they have many existing alternative end uses.

Potential Increases in Secondary Materials Supply

The exercise identified the potential magnitude of increase in recovered secondary materials that will result from meeting the 50% diversion goal. Table 4 lists the potential increase of select secondary materials supply compared to 1990. The supply increases that results from achieving 50% diversion are dramatic. For example, the scenario listed in Table 3 would result in a paper supply increase in excess of 5 million tons, the equivalent to approximately 8 large scale newsprint facilities running at full production. Plastics recovery would increase over 2,000 percent, or 1.6 million tons, and organics recovery would increase by over 9 million tons, or 646%. It should be noted that these tonnage figures are a function of the year 2000 waste generation projection.

Table 4 **Potential Increases in Secondary Materials Supply If 50% Diversion Scenario Is Met**
(Figures are for year 2000, compared to 1990, based on Table 1 and Table 3.)

Material Type	% of Materials Diverted (2000)	Tonnage Increase (M tons per year)	% Increase
Newsprint	60	1.08	139
Corrugated	65	1.95	126
Computer Print-Out	50	0.15	148
Hi-Grade Ledger	50	0.24	135
Mixed Office Paper	50	0.29	117
Mixed Paper	33	1.78	1,088
Total Paper	**50**	**5.49**	**176**
HDPE	80	0.28	1,548
PETE	70	0.06	399
Film Plastics	60	0.62	3,101
Other Plastics	38	0.68	2,723
Total Plastics	**50**	**1.64**	**2,079**
Glass Containers	54	0.26	51
Other Glass	45	0.16	413
Total Glass	**50**	**0.42**	**72**
Aluminum Cans	94	0.10	73
Bi-Metal Containers	66	0.04	234
Municipal Ferrous	12	0.18	394
Tin Cans	66	0.20	N/A[4]
Non-Ferrous Scrap	10	0.02	N/A
White Goods	90	0.17	N/A
Other Metals	0	0.00	N/A
Total Metals	**50**	**2.25**	**291**
Yard Waste	80	5.56	1082
Food Waste	42	1.32	348
Wood Waste	55	2.17	485
Misc. Organics	2	0.00	0
Total Organics	**58**	**9.05**	**646**
Tires & Rubber	97	0.55	1,175
Textiles and Leather	5	0.00	0
Inert Solids	80	3.4	N/A
Other and Unsorted	2	0.00	0
All Other Materials	6	0.00	0
Total "Other"	**37**	**3.95**	**1,241**
TOTALS	**N/A**	**21.4**	**389**

note: tonnage increase = (2000 generation * % diverted) - (1990 generation * % diverted)

Because diversion rates have already increased somewhat since 1990, the actual tonnage increase over 1993 diversion would be somewhat less than that depicted in Table 4. Although no estimate of the overall 1993 diversion rate is available, increases in the collection and processing capacity illustrate the fact that California is rapidly developing a broad-based diversion infrastructure. For example, in 1993 over 60% of the population was served by 446 municipal curbside recycling programs, compared to 16% served by 145 programs in 1990. Likewise, the number of certified buy-back centers for beverage containers increased 8%, from 2,089 in 1990 to 2,260 in 1993.[5] Facilities that process recyclables now have a combined capacity of in excess of 19 million tons per year, and although no 1990 figure is available for comparison, approximately 1.4 million tons of composting capacity was identified through a 1993 survey.[6]

Measuring the "Gap" Between Supply and Demand

Many recycling officials have pointed to the need to estimate the potential "gap" between projected supply and demand for each secondary material type. This would allow market development efforts for each material to be targeted at quantified goals. However, because there is not single scenario under which California will achieve the 50% diversion goal and because projecting supply and demand levels in the future is difficult, it is not feasible to estimate the gap for each material. Despite this, several general conclusions for each material type can be made and are listed in Table 5. As stated previously, these projections are based on Board staff estimates. Further documentation is available in the Market Status Reports prepared in late 1992 for each secondary material type. Reports were prepared for paper, glass, metals, plastics, organics, tires, wood waste, and inerts.

Table 5 General Market Projections for Major Material Types

Material Type	General Market Projections
Paper	Demand for mixed paper grades is far short of that needed to achieve high diversion rates. It is unclear whether demand for corrugated cardboard, newsprint, and boxboard is sufficient to accommodate the diversion rates depicted in the year 2000 scenario. Demand for high grades and computer print out is not sufficient for the diversion rates depicted in the year 2000 scenario.
Glass	Markets for glass cullet should be sufficient to support the diversion rates depicted in the year 2000 scenario. This is largely due to the effects of minimum content legislation for glass containers and fiberglass insulation. Market demand may be insufficient for mixed color cullet. Markets for non-container cullet remain low.
Plastics	Demand for secondary plastics will require dramatic increases to achieve the levels depicted in the year 2000 scenario.
Metals	Demand for most types of metals in the waste stream remains strong. Diversion is primarily dependent on recovering materials at sufficient quality levels.
Organics	Dramatic increases in source reduction efforts, collection, composting and other processing facilities and in market demand will need to occur to achieve the diversion levels depicted in the year 2000 scenario.
Other Materials	Demand for some materials in the "other" category may improve sufficiently (e.g., tires). The largest amount of any single material in this category is inerts. Although many diversion options exist for most inert materials, significant efforts may need to be made to achieve the 80% diversion level depicted in the year 2000 scenario.

Potential for Manufacturer Responsibility and Fee Options to Assist in Achieving the Statewide Goal

Essentially all materials in the waste stream can be classified according to who most directly controls their generation and use. One such classification follows:

> The generation of "manufactured product waste" is influenced by the relationship between manufacturer production decisions and consumer demand. It accounts for approximately 47% of the California waste stream and includes packaging (21%), non-durable products (17%), and durable products (9%).
>
> "Organic waste" generation is affected by land use management practices, natural processes, and other waste generator decisions. It accounts for approximately 32% of the California waste stream and includes yard waste (14%), food waste (7%), wood waste (9%), and other organics (2%).

The generation of "industrial and other" waste results from decisions regarding production processes. It accounts for approximately 21% of the California waste stream and includes a wide variety of materials such as ash, construction and demolition debris, and other inerts.

Figure 1 portrays the breakdown of California's waste stream using the above classification system. Figure 2 breaks out the components of what is termed manufactured product waste. Because a primary emphasis of manufacture responsibility and front-end fee options is affecting secondary materials use by manufacturers, these options are most applicable to manufactured product waste. These options can affect almost one-half of California's waste stream. In 1990, diversion of manufactured product waste accounted for over two-thirds of all waste diversion. In the year-2000 scenario depicted in Table 3, these product wastes account for slightly less than half of all diversion.

Figure 1 1990 California Waste Stream Composition[7]

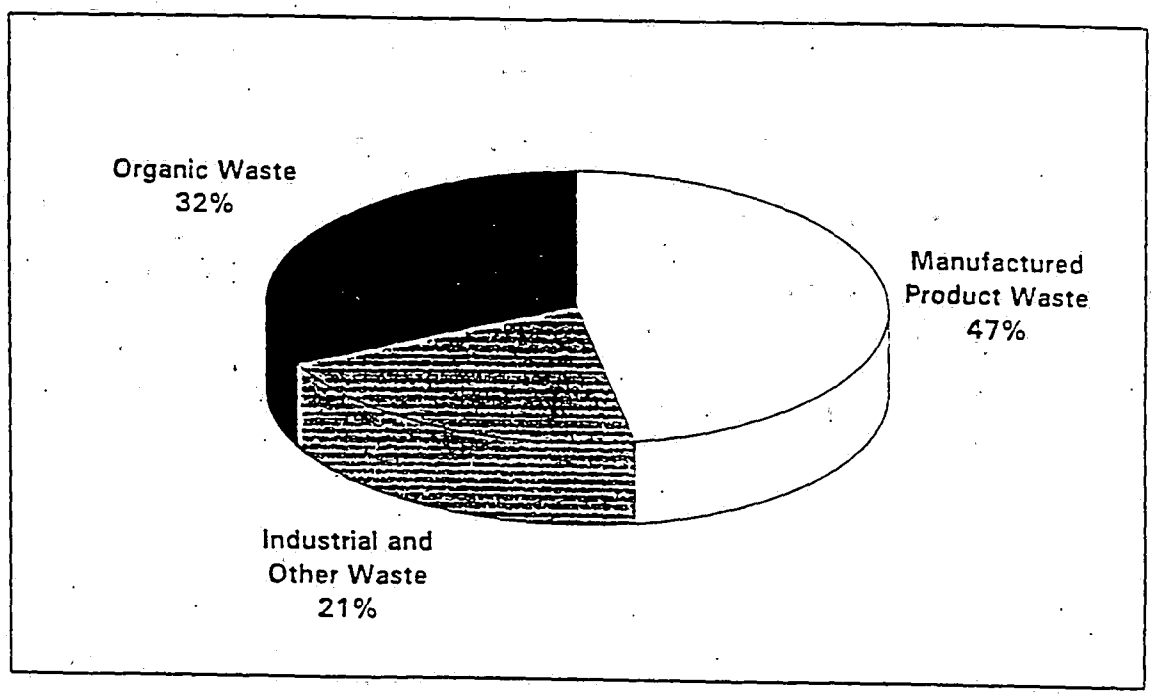
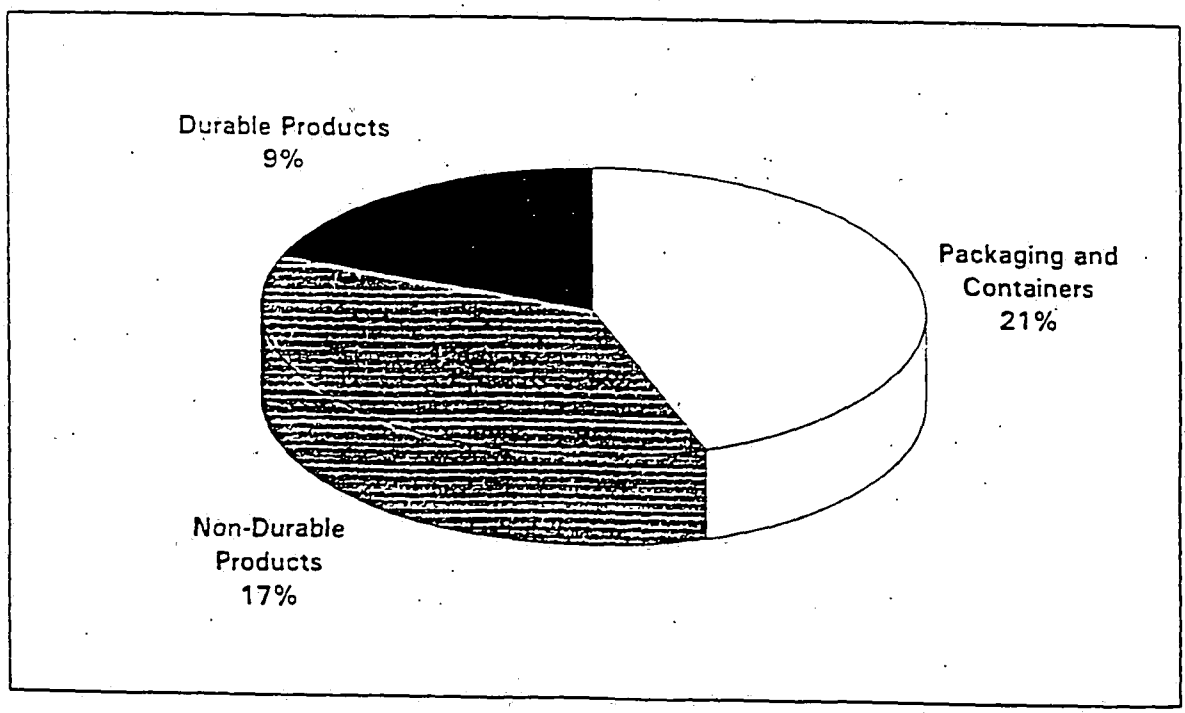


Figure 2 Components of Manufactured Product Waste
(percentages represent portion of the entire waste stream)



3. Evaluation and Screening Criteria

The criteria listed below provide a framework for evaluating legislative proposals related to fee and/or manufacturer responsibility options. The criteria are intended to represent the issues of most concern to the Board in evaluating market development legislative proposals. In later sections the criteria are used as a basis for evaluating each generic manufacturer responsibility option. Under each criterion a number of key indicator questions are listed. These questions are meant to indicate the general focus intended for each criterion.

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

- Does the option mandate increased secondary materials utilization?
- Does the option provide incentives to utilize secondary materials?
- Does the option provide a dedicated revenue source to provide financial assistance for statewide and regional market development programs?
- Does the option promote increased quality and availability of secondary materials?
- Does the option encourage a shift in investment to technologies that can readily utilize postconsumer materials?
- Does the option foster new technologies and continuous improvement in existing technologies?

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

- Is there an identified funding source to implement the option?
- Do the projected benefits of the option justify the implementation costs?
- Is the option consistent with existing legislation and trends in California?
- Does the option include an effective enforcement mechanism?
- Is there a mechanism to measure the option's success?
- Is there reasonable certainty that the option can be successfully implemented?
- Is the time frame for implementing the option acceptable?

- Does the option build on existing infrastructure in collection/ processing and utilization?

- Is the option consistent with interstate and international trade laws?

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

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

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

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

- 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.***

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

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

- Does the option have neutral or positive impacts to business development in California?

Criterion #5 ***The option should be consistent with, or it should promote, source reduction and other integrated waste management goals.***

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

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

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

- Does the option promote compliance with solid waste facility requirements?

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

- Does the option attempt to account for the full costs of waste management activities?
- Does the option internalize waste management costs into standard business and consumer costs?
- Does the option credit recycling with the avoided costs of disposal?

4. Evaluation Issues Common to Most Fee and Manufacturer Responsibility Options

This section identifies several evaluation issues common to all front-end fee and manufacturer responsibility options. These issues are broader and often conceptual in nature when compared to the criteria established in Section 3.

FOCUS ON MARKET DEVELOPMENT

In evaluating the fee and manufacturer responsibility options described in subsequent sections, considerable attention is placed on criteria one through three, which indicate an option's market development potential and practical feasibility of implementation. The decision to focus on market development rather than waste prevention was based largely on the direction given to staff through the Board's Market Development Plan and a determination that diversion efforts are the primary means to achieve the 50% waste diversion goal in 2000.

This decision to focus on market development should not be construed as reason to de-emphasize the need for continued waste prevention. Waste prevention efforts are critical if 50% diversion is to be achieved by the year 2000. In fact, the study team determined that waste prevention will be able to contribute as much as 10 percentage points to the overall diversion goal. This estimate was based on qualitative assessments by Board staff responsible for researching each secondary material type and by staff responsible for the Board's **Statewide Waste Prevention Plan**.[8] Further support for this determination is provided by two recent studies conducted in the New York City Metropolitan region that estimated maximum waste prevention levels at between 8% and 14%.[9]

THE QUESTION OF RESPONSIBILITY

A key tenet often used to justify manufacturer responsibility policies is the "polluter pays principle." This concept implies that the originators of waste (the "polluters") should be responsible for managing the wastes they create. This principle has never been stated explicitly in California waste management legislation, and a consensus on the proper allocation of responsibility for funding and carrying out activities crucial to waste diversion does not exist. At the April 1993 Market Development Committee meeting, manufacturers argued that consumers should bear the full weight of responsibility for managing the wastes associated with products and packaging purchased. Other groups, including environmental advocates and local government officials, argued that for waste diversion to succeed, manufacturers must assume some degree of responsibility.[10]

Initially, in California the onus for attaining waste management goals was placed on local governments; however, more recent legislation requires the private sector to assist in meeting diversion mandates by creating increased demand for secondary materials. The Integrated Waste Management Act (AB 939) placed the

responsibility for waste diversion on local governments. They are required to demonstrate diversion of 25% of their waste stream by 1995 and 50% by the year 2000.

This Act was followed by a series of minimum content legislation that held manufacturers responsible for using postconsumer content in newsprint, glass containers, fiberglass insulation, and plastic trash bags. Provisions in the Rigid Plastic Packaging Container Act go beyond traditional minimum content legislation and allow manufacturers the flexibility of deciding how they prefer to contribute to California's waste diversion and market development goals. Manufacturers can comply with the law by either source reducing, refilling, reusing, or recycling their rigid plastic packaging containers, or they can use postconsumer content in their manufacture. The analysis in this report does not attempt to resolve the political question of who is ultimately responsible for waste management activities.

LOCAL, STATE AND FEDERAL JURISDICTION ISSUES

An issue that recurred frequently throughout the study is that of jurisdiction.[11] It is apparent that many of the manufacturer responsibility and front-end fee options considered in this study may be best suited for application at the federal level. Still, action at the state level may be necessary to promote regional market development needs. Also, California market development objectives primarily are driven by the 1995 and 2000 diversion milestones established by the IWM Act.

Versions of manufacturer responsibility options have appeared in proposed federal legislation, but have not been enacted.[12] Additionally, the national Recycling Advisory Committee is currently considering a range of manufacturer responsibility and fee options in preparation for making recommendations for federal legislation. The analysis herein is intended to provide state-specific input into the national debate, while examining the potential for California to proceed within its own time frame.

Similarly, some view the back-end fees considered in this analysis as within the purview of local jurisdictions, not as a state government issue.[13] This is particularly true of the waste generation fee, which would require unit-based waste disposal pricing systems to be in place prior to implementation. As with the question of responsibility, the question of the proper jurisdictional authority for administering these options is beyond the scope of this analysis.

INDUSTRY-WIDE VS. COMPANY-SPECIFIC ENFORCEMENT

Manufacturer responsibility options may be enforced either on a company-specific basis or on an industry-wide basis. Industry-wide enforcement provides more flexibility to individual companies within an industry and may help to minimize compliance costs. Capital investment can be appropriately targeted to those companies with higher cost efficiencies, as opposed to an across the board investment by all companies that a company-specific mandate would require. Two

benefits of company-specific mandates are that they ensure accountability by individual firms and they reward companies that have already invested in equipment that allows use of recycled material in their manufacturing processes.

Precedents for industry-wide enforcement have been set in Germany, Canada and in the State of Oregon. In Germany the goal is for each material industry (e.g., glass, paper, etc.) to achieve specified minimum recovery, sorting and recycling rates by a specified date. If the goal is not achieved, a system of onerous front-end fees and a comprehensive take-back program comes into play. Specific companies may avoid the fee and take-back requirements by participating in an industry-wide organization formed with the exclusive purpose of achieving the government-set goal. In Canada, the Canadian Packaging Stewardship Model involves all brand name owners using retail packaging. Each company is required to either license its packaging for sale in Canada or demonstrate its participation in an approved industry funding organization. In Oregon, publishers are required to "voluntarily" achieve a 25% purchase level for recycled content newsprint by 1995. If the industry-wide goal is not achieved, then each individual consumer must ensure that all newsprint purchased contains at least 7.5% recycled content.[14]

In California minimum content legislation has largely been company-specific. However, the Rigid Plastic Packaging Container Act provides an industry-wide compliance option. If 25% of all rigid plastic packaging containers are recycled, then all manufacturers using rigid plastic containers to package their product will be in compliance. If the industry-wide recycling rate is not met, then compliance requirements default to company-specific waste diversion and market development requirements.

NARROW VS. BROAD SCOPE

Both front-end fee and manufacturer responsibility options can be enforced on a narrowly-defined product or material category (e.g., "newsprint") or on a broader basis (e.g., "paper" or "packaging"). In the United States, minimum content laws are examples of both package and product-specific requirements. Approaches in Europe are generally targeted at packaging. Often the appropriate scope is dictated by the specific market development objective.

POTENTIAL FOR VOLUNTARY ACTION

An implementation approach applicable to all options is to promote voluntary activity by manufacturers. In Europe, both Spain and France have asked industry to develop plans for comprehensive packaging recycling, prior to the government drafting legislation.[15] The Oregon law previously cited also called for the formation of an industry task force to explore effective market development options. Another example of government effecting voluntary efforts is the "Preferred Packaging Manual" developed jointly by the Coalition of North East Governors (CONEG). Voluntary agreements have been criticized by recycling advocates for

lacking enforcement mechanisms, which makes them less effective than a mandate. Many recycling advocates feel that voluntary agreements are inferior to mandates, given the need for aggressive activity. Others point to voluntary agreements as the only way to promote action within the market framework.[16]

POTENTIAL TO INCREASE DEMAND

Manufacturer responsibility and front-end fee options are most applicable to manufactured product waste, as defined in Section 2.[17] These options can impact approximately one-half of California's waste stream. For example, a 50% utilization policy directed at all packaging (21% of the waste stream) would result in mandated utilization of approximately 11% of the entire waste stream, including diversion which would otherwise occur. Similarly, a 50% utilization policy directed at all packaging and non-durable products (38% of the waste stream) would mandate utilization of approximately 19% of the waste stream.

Because they are assessed near the point of disposal, back-end fees can impact the generation and disposal of all materials in the waste stream; however, these fees do not necessarily contribute to market development goals. Traditionally, back-end fees have been used by local governments to finance waste collection and disposal services, but they could be dedicated as a financing source for market development activities.

PRACTICALITY OF IMPLEMENTATION

Implementing and enforcing any of the fee and manufacturer responsibility options would include the following generic components:[18]

- identify and track regulated entities,
- provide program assistance and outreach to affected entities,
- review and grant waivers and exemptions,
- monitor certifications and compliance,
- assess fines and penalties, and
- collect and disburse any funds.

In general, the cost of each activity increases with the number of entities involved and program complexity. The number of entities can grow quite large if retailers and point-of-sale packagers are included or if the option is applied to a very broad range of manufacturers. For example, California's Rigid Plastic Packaging Container Act could affect as many as 100,000 entities, most of these are restaurants, grocery stores and convenience stores that handle point-of-sale packaging (e.g., coffee cups).[19]

The need to regulate out-of-state entities, also, can complicate enforcement. Although never tested in court, Board attorneys have stated that out-of-state manufacturers selling products in California could be directly regulated. An alternative is to designate the first in-state sale as the point of regulation. If

adopted, this policy would affect companies that distribute and broker consumer products in California.[20]

Another implementation issue, most relevant to packaging, is the question of who constitutes the "manufacturer." It has been suggested that because brand name owners make decisions regarding how their products are packaged, that they are the appropriate target of packaging related legislation. Defining brand name owners as the responsible entity can complicate enforcement because there are over 6,000 private label manufacturers in the U.S.[21] and many point-of-sale packagers use packages with no brand name attached.

Enforcement constitutes a potentially significant cost associated with implementing these options. Currently, the broadest based regulatory schemes involving waste management in California are the Beverage Container Recycling and Litter Reduction Act (AB 2020) and the Rigid Plastic Packaging Container Act (SB 235). The AB 2020 program involves approximately 2,000 on-site audits per year, while it is recommended that the RPPC program include approximately 100 on-site audits per year. The AB 2020 program requires a high enforcement level to ensure the integrity of funds in the Beverage Container Recycling Account.

At a recent Board workshop, some suggested that compliance audits can be minimal and that even if compliance is not complete, it is likely to be sufficient to cause significant impacts.[22] For example, although the Board has yet to complete a single audit in administering the newsprint minimum content program, the law is credited with greatly improving markets for old newsprint. Program administration costs for both the public and private sectors can be further reduced by exempting small-scale businesses.

BUSINESS IMPACTS

Manufacturer responsibility and fee options, like other regulatory approaches, can have many unexpected and unintended impacts. Impacts may affect market share and access, profitability, or pricing. Additional regulations may also increase the *perception* that California is "unfriendly to business." Many of the options would require some businesses to undertake new activities; for example, utilization rate requirements would require manufacturers to ensure the use of recovered materials in new products, potentially requiring transactions with both recycling collection firms and end-use companies. Options involving fees would directly add a cost to selling products in California. Yet, some options may actually provide support to select businesses. For example, California's newsprint minimum content law has been credited with encouraging several manufacturers of recycled newsprint to consider locating new facilities in the state.

While administrative and compliance costs may be kept to a minimum through self-certification, as with existing minimum content laws, these requirements may be onerous to small businesses. To counteract this, and to keep state administrative costs at a minimum, exemptions could be provided to specified small businesses.

5. Overview of Fee Options

BACKGROUND

This section provides a brief overview of fee options, and evaluates their potential to achieve the study's criteria listed in Section 3.[23] Two broad categories of fee options are considered. *Front-end fees* are assessed on products and packaging prior to consumption and are often referred to as "advanced disposal fees" (ADFs). *Back-end fees* are assessed in conjunction with waste management services after products are consumed and waste materials are generated.

Generally, fees can be structured either to provide a revenue stream or to affect behavior. A bridge toll is an example of a tax intended to generate revenue to cover expenses associated with service delivery. "Sin taxes" on products such as cigarettes and liquor are an example of a tax intended to affect behavior; making these products more expensive should discourage people from smoking. Fees can promote secondary materials market development in two ways. They can be structured to provide an incentive to use secondary materials or they can provide a revenue stream dedicated to market development programs such as research and development, public education, or the Board's Recycling Market Development Zone Loan Program. As part of developing any fee proposal, the primary goal, a revenue stream versus behavior modification, would need to be defined.

THE RANGE OF FRONT-END FEES

There is no discrete list of front-end fee options. Rather, a very broad range of theoretical fee options exist. The range of theoretical fees can be appreciated by considering the elements that comprise a fee:

- Who pays the fee?
- At what point in the product lifecycle is the fee paid?
- What is the basis for differentiating the fee between products or materials?
- What is the calculation rationale for any specific product or material?
- What is the desired impact of the fee?

Each fee element can be defined in a number of ways. For example, theoretically front-end fees can be assessed on raw material producers, manufacturers, distributors, retailers or consumers. The basis for differentiating the fee between different products can be volume, weight, number of units, or a percentage of sale price. The calculation rationale could be the result of political negotiations or it

could be based on the cost of collection and processing, the cost of disposal, or the "full environmental" cost of disposal. The desired impact of the fee may be to promote market development, waste prevention, or other targeted goals. As the purpose of this study of this study is to identify and evaluate market development policies, fee options will be discussed primarily in terms of their ability to further these goals.

The complete, theoretical range of front-end fee options can be classified into four generic categories, as follows:

- A "mass minimization fee" is structured to influence decisions regarding the total weight or volume of a product or package.
- A "material characteristic fee" is structured to influence the type of material used in products or packaging.
- A "design characteristic fee" is structured to influence the reusability, recyclability, or durability of products or packaging.
- A "incremental unit fee" is structured primarily to generate revenue.

These fee structures are not mutually exclusive. For example, California's beverage container processing fee program is an example of a combination of a material characteristic fee, it targets specific material types with a variable rate structure, and a design characteristic fee, the amount of fee is determined by the average cost of recycling each material type. California's Tire Recycling Fee is an example of an incremental unit fee.

THE RANGE OF BACK-END FEES

Back-end fees are assessed after waste has been generated and they, too, can differ in the point of assessment. Back-end fees can be levied at either the generator level, which would mean that residences or business directly pay the fee, or they can be assessed at the point of ultimate disposal, which would most often entail the waste hauler directly paying the fee. The former are referred to as waste generation fees, while the latter are known as disposal surcharges. The fees can either be calculated on a unit basis (e.g., per ton or cubic yard of waste disposed) or they can be a flat rate.

The Board's primary funding mechanism, the Integrated Waste Management Fee is levied on each ton of waste disposed in landfills and is an example of a back-end fee that is assessed at the point of disposal. Some local governments finance their solid waste services using a waste generation fee. To encourage waste prevention and diversion, recent discussion has focussed on the need for back-end fees to be calculated on a unit basis, as opposed to a flat rate. As with front-end fees, the ability to encourage these behaviors using the rate structure is a benefit. When

properly applied, a back-end fee can provide direct monetary incentive to waste generators to reduce the amount of waste they generate.

EVALUATION OF FEE OPTIONS

Because fee options are defined at a broad level, it was not possible to fully evaluate options based on the study criteria. For example, before the practicality of a particular front-end fee option can be discussed, its elements must be defined. Because there is much room for variation in defining these elements, quantitative analysis of fee impacts (e.g., cost or diversion) cannot be performed until initial decisions are made regarding how the variables should be defined.

The cost of implementing any fee option generally increases with the number of fee payers and the complexity of the fee calculation, as discussed in Section 4. Attempts to keep the program simple are complicated by a troublesome paradox regarding the implementation of front-end fee systems. Front-end fees are most simple if a flat rate per unit is assessed. This removes the need for a separate calculation formula for different types of products or packaging. However, because the characteristics (e.g., weight, volume, or ability to be recycled) of different materials used in products and packaging varies, this is viewed as inequitable to manufacturers.

On the other hand, if a variable fee approach is used, another dilemma occurs. Although the equity issue may be addressed, the cost of implementing the fee may become unacceptable. For example, if the "actual cost of recycling" each material is used to calculate the fee, government officials must conduct complex and resource intensive calculations to determine the fee accurately. Because secondary materials markets are dynamic, these calculations would need to be repeated over time, lest they become outdated. Furthermore, as demonstrated by California's experience with the beverage container processing fee, performing complex calculations regarding specific material types is almost certain to lead to continuous challenges by affected parties.

A general front-end fee structure most able to promote market development is the materials characteristic fee. This fee can be applied to manufacturers or raw material suppliers and has an inherent incentive for secondary materials use. As mentioned above, there are practical concerns that would need to be addressed prior to pursuing any such fee.

Although their market development potential is limited to generating revenue, some back-end fees are far more practical to implement than front-end fees. For example, the Board of Equalization collects the Board's current landfill fee at the point of disposal. In 1992-93, the costs to collect the fee amounted to less than 0.5% of the revenue collected.

Other back-end fees might be more complicated to implement. For example, instituting local waste generation fees would be complex because each jurisdiction's waste management system is unique. It would be difficult to develop a single state-mandated rate structure that all jurisdictions could implement. However, by allowing local jurisdictions flexibility, such as phased approaches, limited exemptions or alternatives for applying the fees, an overall approach could be developed. Waste generation fees have the added benefit of providing waste generators a direct incentive for waste prevention.[24]

6. Overview of Manufacturer Responsibility Options

Eight options for manufacturer responsibility policies were identified and analyzed. The options are as follows:

- Minimum Content and Other Product Requirements
- Minimum Content Requirements with Tradable Credits (Minimum content options are discussed in Report #2 and tradable credits are discussed in Report #4, which is summarized in Appendix 4 of this document.)
- Utilization Rate Requirements
- Multiple Compliance Options
- Mandatory Take-back Requirements
- Industry Funding Organization
- Assigned Responsibility for Waste Recovery Activities
- Assigned Responsibility for General Waste Management Activities

Additional evaluation of these options and related issues is available for interested readers. Report #2 of the Emerging Market Development Options series contains a more detailed and documented explanation of the issues and findings. Appendix 4 of this document can be consulted for further discussion of tradable credit applications. For an overview of a methodology that can be used to compare possible manufacture responsibility options within a cost-benefit framework, refer to Appendix 3. Appendix 3 provides insight into the components that need to be considered to determine the net cost or benefit of a specific manufacturer responsibility option; however, because the findings are based on many caveats, they are not directly included in this study.

Table 6 summarizes, in a qualitative manner, the key findings for each of the manufacturer responsibility options that is bulleted above. The issues discussed in Section 4, which are common to all options, are not further discussed in Table 6. Overall, findings indicate that options such as specified minimum content and utilization rates merit further consideration. These options appear to offer the most benefits at the lowest cost in the context of the criteria outlined in Section 3. Those options that are recommended for Board consideration are discussed in Section 7.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

MINIMUM CONTENT AND OTHER PRODUCT REQUIREMENTS

Description	Precedents	Key Findings
Minimum content requirements mandate manufacturers to use specified percentages of secondary materials in products. The mandate may also be directed at purchasers of products, as with California's newsprint minimum content legislation. Other requirements conceivably could be placed on products in a manner similar to minimum content. Examples include minimum refill rates, reduced weight of packaging or minimum durability requirements.	Minimum content legislation has been enacted in California for newsprint, glass containers, fiberglass insulation and plastic trash bags. Minimum content legislation has also been enacted in approximately 14 other states. Versions of minimum content requirements have been introduced in federal legislation, but not enacted. Minimum content requirements are one of six "first tier" options under consideration by the national Recycling Advisory Council's Market Development Committee. The "Clean Glass Recycling Act of 1990" (Public Resources Code Sec. 7000 et. seq.) is an example of other product regulation. This act bans from sale any glass container with ceramic components.	**Increased Demand** - Potential to significantly and rapidly increase demand demonstrated by California glass, fiberglass and newsprint laws. Demand increases may precede regulation development and mandate dates. Demand increases may be both direct (due to achievement of mandate) and indirect (strengthening of regional market). **Practicality** - Requires minimal staffing for implementation. - Out-of-state enforcement may complicate implementation. - Scope (i.e., materials or products covered) should be balanced with implementation costs. - Due to technical and/or regulatory constraints, can only be applied to select materials or products. **Business Impacts** - Direct administrative requirements can be minimized through "self-certification" process. - Adds regulatory burden to businesses. - Inability to implement on a broad basis benefits material or product substitutes that are not subject to regulation. **Economic Development Impacts** - Can promote new in-state economic development activity. **Other IWM Goals** - Depending on the materials and products covered, may create incentives to switch to a non-regulated material. This could inhibit progress toward achieving other waste management goals, including waste prevention and diversion.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

MINIMUM CONTENT WITH TRADABLE CREDITS		
Description	**Precedents**	**Key Findings**
Tradable credits allow entities to comply with minimum content requirements by purchasing credits from other entities who have exceeded the minimum requirement. The Board would need to establish guidelines for issuing and/or trading credits.	Tradable credits have yet to be applied to minimum content requirements. Tradable credits have been recommended as a compliance alternative in California's Rigid Plastic Packaging Container Act, discussed below.	**Same as minimum content, with the following exceptions:** **Increased Demand** - Potential impact on demand is determined based on several specific criteria, including the number of companies in the affected industry, existing use of recycled content, and market share. **Practicality** - May increase staffing and other implementation costs (depending on the implementation strategy used) relative to traditional minimum content. **Business Impacts** - Provides increased flexibility for compliance compared to traditional minimum content. - Real and perceived transaction costs and competition between companies may inhibit trading. **Economic Development Impacts** - May result in more efficient use of resources to achieve a given content level.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

UTILIZATION RATE REQUIREMENTS		
Description	**Precedents**	**Key Findings**
Utilization rate requirements, like minimum content, require entities to ensure a minimum level of usage of secondary materials in new products. However, unlike minimum content, material usage is not restricted to the regulated product.	Utilization rates have yet to be enacted in any state or country. A version of utilization rate legislation was briefly included in federal legislation that was not enacted. (S 976 by Senator Max Baucus, as amended on March 27, 1992). A version of utilization rate language has been circulated by Californians Against Waste, but has not been introduced into proposed legislation.[25] Utilization rates are one of six "first tier" options under consideration by the national Recycling Advisory Council's Market Development Committee.	**Increased Demand** - Same pros as minimum content. - Significant potential to greatly increase demand for a broad range of secondary materials. - Promotes new product development, and alternative uses for hard-to-recycle secondary materials. **Economic Development Impacts** - Promotes and may provide monetary support to small businesses in California that develop and implement innovative alternative use technologies. **Practicality** - Not yet determined to be feasible on a company-specific basis. - Enforcement complicated by potentially large number of regulated entities and tracking material flow. **Business Impacts** - Administrative costs unknown, but would depend on required compliance documentation. **Other IWM Goals** - Can include refilling as an acceptable utilization option. - May provide support to collection programs for some material types. **Pricing Characteristics** - Depending on how mandate is structured, may directly internalize some costs associated with collection and processing of some secondary materials.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

MULTIPLE COMPLIANCE OPTIONS		
Description	**Precedents**	**Key Findings**
Multiple compliance options mandate manufacturers to comply with at least one of several options.	California's Rigid Plastic Packaging Container Act (Public Resources Code Section 42300 - 42345) is an example of multiple compliance option legislation. The Act requires rigid plastic packaging containers to comply with at least one of five requirements: minimum content, minimum refill/reuse rate, minimum recycling rates or reduced weight per unit of product. Legislation similar to California's SB 235 has also been enacted in Oregon. Multiple compliance has been included in proposed federal legislation. [26] Legislation in Minnesota requires all packaging to be either reusable or recyclable, and to attain specified content levels.[27] Switzerland has mandated that beverage containers be refillable or made with recycled material.[28]	**Increased Demand** - Depending on range of compliance options that are offered and the specific industries that are regulated, could increase demand for secondary materials. **Practicality** - Depends on targeted materials and mandated compliance levels. - Multiple compliance options are marginally more difficult to administer than traditional minimum content laws. **Business Impacts** - Provides a significant degree of flexibility in compliance. - Allows entities that would otherwise have legitimate grounds for an exemption to be included under the purview of the law. - Allows business to minimize their compliance costs by selecting the option that they can implement most cost efficiently. **Other IWM Goals** - Can promote simultaneously a variety of waste management goals

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

MANDATORY TAKE-BACK REQUIREMENTS		
Description	**Precedents**	**Key Findings**
Mandatory take-back requirements would mandate manufacturers to accept back packaging and/or waste associated with specified products. To provide a diversion incentive, the mandate would need to be combined with a requirement to recycle, refill or otherwise manage returned materials. To provide a market development incentive, the mandate would need to be combined with a content or utilization requirement.	Take-back requirements are similar to deposit laws in some states, in which beverage containers are returned to manufacturers for refilling. Comprehensive take-back requirements for packaging were implemented as a component of the German program.	**Increased Demand** - The option has no direct market development component. Consequently, an oversupply of materials may develop if applied on a broad scale. **Practicality** - Government implementation costs can be minimal. **Business Impacts** - Would result in significant costs to businesses at all levels of the value adding chain. **Other IWM Goals** - Provides a strong source reduction incentive, to decrease the amount of materials being "taken back." - May significantly increase public awareness of waste associated with packaging and products. - In some cases, may increase the overall efficiency of collection (e.g., where direct backhaul is feasible). - Local governments may benefit from reduced costs for diversion programs. However, resources already invested may be wasted if not incorporated into the system. **Pricing Characteristics** - Would directly internalize costs associated with specified management of returned materials.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

INDUSTRY FUNDING ORGANIZATION		
Description	**Precedents**	**Key Findings**
An industry funding organization would be a privately initiated and operated organization that collects revenue from participating firms and disburses funds to support market development, recycling collection, or other activities. An industry funding organizations is a privately operated front-end fee system through which industry assumes responsibility for achieving specified market development and/or waste diversion goals.	The Canadian Packaging Stewardship Model, proposed in Canada, requires formation of an industry funding organization. The consortium of German manufacturers DSD is a version of an industry funding organization. Industry funding organizations are also being developed in France and other European countries.	**Increased Demand** - Can increase demand in several ways, depending on ultimate structure and goals of the IFO: a) establish a fee system with a rebate/exemption for secondary content; b) dedicate revenue collected to development of an end-use infrastructure; or c) make participation in the IFO contingent upon a commitment to market development. **Practicality** - An IFO could be established with minimal government implementation requirements. **Business Impacts** - An IFO allows regulated parties more flexibility than traditional mandates. - Would result in significant cost to implement and fund by businesses. - Could result in unintended market distortions, depending of the funding mechanism employed. **Economic Development Impacts** - Could significantly promote and assist in development of new recycling businesses. **Other IWM Goals** - May provide a direct incentive for source reduction, design for recyclability or other goals depending on the structure of the funding mechanism employed. - May provide funding for local recovery and processing programs. - Can be structured to promote refilling. **Pricing Characteristics** - May internalize some or all recycling collection, processing and end-use costs, or other waste management costs, depending on the structure of the funding mechanism employed.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

ASSIGNED RESPONSIBILITY FOR WASTE RECOVERY ACTIVITIES		
Description	**Precedents**	**Key Findings**
This option would assign responsibility to achieve waste diversion goals to manufacturers. Enforcement would likely require back-drop regulations to encourage companies to participate in an industry-wide program. Affected parties could form an industry funding organization to implement this policy.	Versions of this approach have been adopted in Germany and France, and are under discussion in other European countries and at the European Community level.[29]	**Increased Demand** - The option has no direct market development component. **Practicality** - State costs to implement may be acceptable and limited to monitoring activities. - Local governments may benefit from reduced costs for diversion programs. However, resources already invested may be wasted if not incorporated into the system. - The approach entails a re-focusing of California waste management policy because local government has exclusively been held responsible for recycling collection programs. This could have a negative impact on public infrastructure investment. **Business Impacts** - Significant costs would accrue to California businesses. **Economic Development** - The option may have a detrimental impact on small, independent recyclers. **Other IWM Goals** - The option would internalize some recycling costs, providing an incentive for waste prevention.

TABLE 6: SUMMARY OF KEY FINDINGS REGARDING MANUFACTURER RESPONSIBILITY OPTIONS

ASSIGNED RESPONSIBILITY FOR GENERAL WASTE MANAGEMENT ACTIVITIES		
Description	**Precedents**	**Key Findings**
This option would require manufacturers to ensure that manufactured product waste is managed in specified manner. It is unclear how this would be accomplished in practice; however, an industry funding organization could be formed to implement a mandate.	There is no precedent for this extreme version of manufacturer responsibility. The approach was discussed in a British study investigating waste management policies.[30]	**Increased demand** - This option contains no market develop component. **Practicality** - Implementation and administration could be quite costly, depending on the approach taken. - The option conflicts with existing California legislation and practices which place local governments in charge of waste management operations. This could result in a negative impact on public infrastructure investment. **Business Impacts** - The option would add significant costs for business. **Economic Development** - The option may have a detrimental impact on small, independent waste haulers and recyclers. **Pricing Impacts** - The option would effectively internalize waste management costs into standard business costs, providing a strong waste prevention incentive.

7. Options Suggested for Board Consideration

Based on a screening using the criteria listed in Section 3, the options listed below are suggested for Board consideration. These options were selected because, of those considered in the analysis, they were determined to have the most potential to promote market development based on the criteria listed in Section 3. Each option has unique pros and cons which should be carefully considered by the Board and the Legislature.

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 several parameters (e.g., the materials or products to be covered, etc.). Additional analysis would be required to support and document a legislative proposal. The amount of analysis required varies with each option.

MINIMUM CONTENT REQUIREMENTS

The Board has experience in implementing minimum recycled content laws. Four laws mandate minimum postconsumer content in commodities sold in California, two of which are administered by the Board. The regulated commodities include newsprint, plastic trash bags, glass containers, and fiberglass insulation. In addition, postconsumer content is one of several options available to product manufacturers regulated by the Rigid Plastic Packaging Container Act. California's experience with administering the newsprint, glass container and fiberglass programs demonstrates the potential for minimum content requirements to significantly increase demand for specified secondary materials. The plastic trash bag and container legislation was enacted too recently to draw conclusions regarding their market development impact.

Minimum content standards can be static or stepped. Static requirements must only be met one time and then maintained, while stepped requirements increase over time. Stepped compliance options smooth the transition from virgin to secondary materials use. Initially low content rates allow manufacturers to gain experience in using secondary materials, but because the standards increase over time, market development goals are not compromised. Also, if there are potential shortages in intermediate processing capacity or materials of sufficient quality, stepped compliance allows the market time to adjust to the demand increase for secondary materials.

Other benefits of minimum content requirements include minimal staffing to administer and minimization of manufacturers' administrative costs through self-certification. Criticisms of minimum content requirements include an inability to be uniformly imposed on a large number of different commodity types, inflexibility, and potential to impact market share and profitability of specific industry sectors in an undetermined manner.

Staff is already tasked, through the Board's Strategic Plan, with developing specific minimum content proposals. Some commodities, including corrugated cardboard, boxboard, high-grade ledger paper, and tissue and towels, seem most amenable to minimum content proposals. For these commodities, manufacturing technologies for using secondary materials are well established and while the industry-wide level of secondary materials use is relatively high (with the exception of high-grade ledger paper), minimum content requirements have the potential to create significant additional demand. Consideration of these commodities is supported by the 50% diversion scenario and the anticipated gap between supply and demand that will result from achieving the scenario. Contractor reports completed as part of the overall emerging market development options study also were used to identify commodities that would make likely candidates for future minimum content proposals.

UTILIZATION RATE REQUIREMENTS

Of all the options considered in this analysis, utilization rates have the most potential to increase demand for California's secondary materials. Because they allow secondary materials to be used in any product, they may be applied on an industry-wide basis. Utilization rates provide manufacturers with considerable flexibility in compliance. Utilization rates also would help promote development of new recycled products and may provide support for small businesses.

Currently, no California laws include utilization rate provisions; however, the Board recommended that a utilization rate be included as a compliance option in the Rigid Plastic Packaging Container Act. This Act is in the preliminary stages of program development and will not be implemented until January 1995.

In general, significant concerns exist regarding the costs of administering and enforcing utilization rates. If enforced on a company-specific basis, the administrative costs could be quite significant and a certification procedure would need to be developed. One method would be to adapt the self-certification process used in the Board's existing minimum content programs. Another option would be to require documentation demonstrating the use of secondary materials. Depending on the level of auditing, this could require considerable staffing to implement, may impose substantial administrative costs on businesses, and would be severely complicated by the complexity of tracking materials transactions undertaken by a large number of entities, including some that are based outside of California and the United States. Other implementation alternatives may exist and would need to be carefully researched by Staff, if so directed by the Board.

To reduce administrative costs and provide maximum flexibility to industry, utilization rates could be enforced on an industry-wide basis. Because the State cannot directly enforce requirements on "industry" as a whole, this strategy must include company-specific mandates to encourage an industry-wide response. Again, many potential approaches exist. One scenario would include the following three components:

- A goal is established, for example, 50% utilization of specified materials by 2000.

- In-state manufacturers and distributors (for regulated products imported into California) are required to satisfy one of two conditions by a specified date: 1) present a company-specific plan for achieving the goal for Board approval; or, 2) demonstrate participation in an industry-wide, Board-approved plan. The Board would identify specific plan elements required for approval, such as funding and identification of specific manufacturing capacity expansion projects.

- If the goal is not achieved or the plans not implemented, company-specific state regulations come into play. These serve as a deterrent to non-compliance and are often referred to as "back-drop" regulations. Back-drop regulations can assume many forms, including imposition of a front-end fee or company-specific minimum content requirements.

This strategy may still require significant Board staffing to implement, but would provide industry with maximum flexibility to comply. This approach would, in effect, impose on manufacturers a similar mandate to that which has been imposed on local governments: to achieve a specified diversion rate by a specified date, by the most efficient means available. In contrast to the local government mandate which creates supply, this mandate would be to create demand.

INCREASED LANDFILL FEES

This option consists of increasing the existing fees collected at landfills to fund state programs and using the new revenues collected to fund market development programs. To ensure that funds are not appropriated for use in non-related programs, the funds must be dedicated to specific programs. The market development potential of this option is limited to Board financing programs such as the Recycling Market Development Zone Loan Program. However, its advantages, including ease of implementation and immediate impact, merit its consideration in this context.

WASTE GENERATION FEES

This option involve local governments imposing a fee directly on generators of solid waste (e.g., residences and commercial businesses). If a state surcharge were included as part of the fee, this could provide a dedicated revenue source for market development programs, while providing a direct source reduction incentive to waste generators. Because of the great diversity among local waste management systems, this option would require additional analysis to investigate the specific method for assessing the fee. It is likely that phased requirements, exemptions and/or variations would be necessary to accommodate some jurisdictions in which significant barriers to waste generation fees may exist. As

with landfill fees, waste generation fees would need to be dedicated to ensure that funds are not appropriated for use in non-related projects.

FRONT-END FEES

This option could involve developing a specific proposal based on the "materials characteristic fee" discussed in Section 5. Such a fee could promote market development both by providing an incentive to manufacturers to use secondary materials and by providing a revenue source dedicated to market development programs.

Because a large number of potential fee systems exist in theory, it was not possible to evaluate and screen each option. The materials characteristic fee is broadly defined, and would be assessed on either raw material producers or manufacturers in a manner which provides a direct incentive for the use of secondary materials. The specific amount of fee required to promote behavior change among manufacturers cannot be accurately determined. However, even a relatively small fee would have the potential to generate large revenue streams that could be dedicated to market development.

Prior to developing a specific proposal, many parameters would need to be defined. For example, the fee could be applied to any subset of manufactured product waste, including packaging, durable goods or non-durable products. The amount of the fee could be mandated, determined through negotiation, or tied to a specific calculation formula (e.g., the cost of recycling or the "full cost" of disposal). Generally, the cost of implementing a front-end fee system increases with the number of entities paying the fee, and the complexity of the calculation formula.

CASE-BY-CASE CONSIDERATION OF TRADABLE CREDITS WITH MINIMUM CONTENT LEGISLATION

The desirability of combining tradable credit policies with minimum content requirements depends on the specific industry and content level mandated. For example, if a single entity dominates an industry and already has high content rates, the application of tradable credits may result in no net increase in market demand and, thus, from a diversion standpoint the credits program would be of little market development benefit. Therefore, it is suggested that the Board consider the application of tradable credits on a case-by-case basis during review of proposed legislation.

COMBINATIONS OF FEE AND MANUFACTURER RESPONSIBILITY OPTIONS

Technically, it would be feasible to develop a legislative proposal based on any combination of the options suggested for Board consideration. To avoid conflicting mandates, or to promote select activities, provisions in any bill could be included which provide an "out" if certain conditions are met. For example, company-specific minimum content requirements could become void if industry-wide

utilization mandates were later enacted, or if a company or industry were to develop a Board-approved plan for voluntary action.

Each policy option involves tradeoffs between market development benefits, costs, and the distribution of responsibility among manufacturers, consumers and other groups. Therefore, the desirability of combining options depends largely on political considerations beyond the scope of this analysis.

MULTIPLE COMPLIANCE OPTIONS

The advantage of a multiple compliance option policy is that it allows government to articulate its goals, but provides industry with flexibility in determining specifically how they will contribute to the goals. In California, the Rigid Plastic Packaging Container Act uses multiple compliance options. It establishes five methods to achieve compliance, including source reducing, reusing, refilling, recycling, or using postconsumer content. Thus, manufacturers that are constrained in their ability to meet one of the options have several others from which to choose.

Another feature of multiple compliance options is that this policy allows the Board to simultaneously pursue waste diversion and market development activities. The series of minimum content legislation enacted in the wake of mandatory diversion requirements illustrates that the supply and demand sides of the secondary markets equation cannot be considered in a vacuum.

A structural criticism of a multiple compliance options policy is that by virtue of providing more than one way to comply, the programs's waste diversion and/or market development impact is necessarily diffused. Despite this criticism, multiple compliance options are a powerful tool to elicit industry cooperation in achieving California's waste diversion and market development goals. Additional flexibility can be built into a program by allowing for industry-wide goals to pre-empt company specific mandates.

MATERIAL-SPECIFIC TASK FORCES

Formation of task forces, with representation of manufacturers and other groups, could serve several purposes. At a minimum, task forces could provide a forum for debating the appropriate allocation of responsibility for waste diversion activities and could identify key areas for effective action by all players. Task forces could also provide input on draft legislative proposals developed by the Board.

Another key responsibility that a task force could assume would be to develop a voluntary program for manufacturer participation in market development activities. For example, in the utilization rate option, voluntary participation could entail either an industry proposal for activity which it will initiate or a proposal for a state-operated program that encourages voluntary participation through an incentive system.

8. Notes

1. "Meeting the Challenge: A Market Development Plan for California." Adopted by the Integrated Waste Management Board at its March 1993 meeting.

2. In California, manufacturers are mandated to achieve minimum postconsumer content standards for newsprint, plastic trash bags, glass containers, and fiberglass insulation. In addition, manufacturers using rigid plastic containers to package their products are required to meet one of five waste management or market development options. Proposed federal legislation to re-authorize the Resource Conservation and Recovery Act included minimum content provisions.

3. It should be noted that the tonnage of mixed waste paper listed here is even higher than that in the Board's interim database, upon which the Board based its decision to designate mixed waste paper as a priority material. This resulted from adjustments based on a recent Board study, as noted in Appendix 2.

4. Entries listed as N/A are not available because the initial baseline diversion for these material types were excluded from the Board's database.

5. California Department of Conservation, Division of Recycling. "1990 Annual Report." and phone conversation with staff in the "Certifications Branch." June 1993.

6. The figures for processing facility and compost capacity are estimates based on surveys conducted by Board Staff during early 1993. The capacity cited for recycling processing facilities is likely over-estimated, since the average residual of these facilities is not known. The facilities included include those which process source-separated recyclables and some which process mixed waste to recover recyclables. The capacity figure cited for compost facilities may be under-estimated, because some facilities declined to state their capacity. In both cases, the figures cited are for capacity, the actual throughput of the facilities is not known.

7. The data depicted in figures 1 and 2 were obtained by adapting percentages for packaging, non-durable products and durable products obtained from "Characterization of Municipal Solid Waste in The United States: 1992 Update." U.S. Environmental Protection Agency, July 1992, Chapter 2. The percentage figures from this source were applied to the overall tonnage figure for California commercial and residential waste streams, consistent with the definition used by EPA. The result was very close to that obtained by estimating percentages based solely on Board data, suggesting the legitimacy of the approach.

8. "Statewide Waste Prevention Plan." Adopted by the Board in June 1993.

9. Chartow, Marian and Cal Recovery, Inc. 1992. Waste Prevention in New York City: Analysis and Strategy. Prepared for the New York City Department of Sanitation. In Appendix 3, the total waste prevention level achievable in the City is estimated to be approximately 8%. Also see: Schall, John. Does the Solid Waste Hierarchy Make Sense? Yale University, School of Forestry and Environmental Studies. p.38. September 1992. This study conducted for the New York Metropolitan Region estimated 14% overall waste prevention was achievable by 2015. Although California's higher percentage of organic materials may yield a higher potential for waste prevention, the estimates in the two sources involved many assumptions and caveats. Staff determined the margin of error in the studies probably outweighed any additional waste prevention achievable in California.

10. Emerging Market Development Options Workshop. Held before the Board's Market Development Committee in Sacramento on April 20, 1993. The workshop was an important information gathering step in this study and examined four emerging market development option models: the utilization rate model, the Canadian Packaging Stewardship Model, the recycling incentive fee model and the waste generation fee model. Approximately 50 people attended, representing a wide variety of interest groups. Panelists included Bill Shireman of California Futures, Inc., Derek Stephenson of Resource Integration Systems, Ltd., Lynn Scarlett of the Reason Foundation, Mark Murray of Californians Against Waste, Gary Liss of the California Resource Recovery Association, Mike Silva of CR&R, Inc., Richard Hays of the City of San Diego, Tom Rattray of Proctor & Gamble, Inc., Terry Bedell of Clorox Company, and Dave Modi of Georgia Pacific Corp.

11. This issue recurred frequently at the Emerging Market Development Options Workshop (see note #10). Manufacturers argued that states should abandon efforts to structure the recycling market place, since businesses shouldn't be expected to conform with 50 different mandates. Other groups argued that California should move forward on its own time frame, especially given the existing mandate to divert 50% by 2000. Many made the argument that California could do much to advance the national agenda by examining and moving forward on the controversial policy options discussed at the workshop.

12. Proposals in both the House of Representatives (HR 3865, Swift) and in the Senate (S 976, Baucus) during 1992 included at various times versions of minimum content, utilization rates and multiple compliance options. Both bills failed passage.

13. At the Emerging Market Development Options Workshop (see note #10) Richard Hays of the City of San Diego argued most strongly that local governments had already born their share of responsibility regarding waste

diversion and that imposing specific rate structures on all local governments was unacceptable.

14. Beck, Patty and Pete Grogan. "Minimum Content Legislation: An Effective Market Development Tool." *Resource Recycling*. (September, 1991), p. 90.

15. "European Packaging Legislation Analysis." Prepared by Resource Integration Systems for Environment Canada. September 1992.

16. This debate over the potential ability of voluntary agreements to spawn industry activity in recycling market development was also discussed at the Emerging Market Development Options workshop (see note #10). Manufacturers argued that they were already engaged in efforts to maximize waste diversion, and that the only appropriate role for government is that of a non-regulatory advocate. Environmental and local government representatives argued that the examples of voluntary activity cited by manufacturers were failures, resulting in little benefit to recycling or waste prevention.

17. Many of the manufacturer responsibility and fee options investigated could also be applied to other waste streams, although the "polluter pays" principle may not be used as a justification. For example, a version of minimum content requirements could conceivably require landscapers and soil amendment producers to use municipal compost, although they are not directly responsible for the municipal waste composing the compost.

18. "Conceptual Plan to Implement the Rigid Plastic Packaging Container Act." Prepared by Ernst & Young for the California Integrated Waste Management Board. Adopted by the Board in July 1993.

19. Ibid.

20. At least 400 companies distribute or broker consumer goods in California according to the "Conceptual Plan to Implement the Rigid Plastic Packaging Container Act". Prepared by Ernst & Young for the California Integrated Waste Management Board and adopted by the Board July 1993.

21. Ibid.

22. Emerging Market Development Options Workshop, sponsored by the Board's Market Development Committee (see note #10). Derek Stephenson of Resource Integration Systems, and architect of the Canadian Packaging Stewardship Model, stated that the model was based on 80% compliance in the first years.

23. This section is adapted largely from the draft report, "Fee Options to Support Integrated Waste Management." This is the third report in the Board's series on emerging market development options.

24. At the Emerging Market Development Options Workshop (see note #10), some argued that waste generation fees can actually impact manufacturer behavior as well as consumers. The argument is based on the assumption that consumers will purchase products with least waste, and that manufacturers will respond in turn to the demand for such products. This argument was soundly rejected by many in attendance.

25. At the Emerging Market Development Options Workshop (see note #10), Mark Murray of Californians Against Waste discussed this proposal.

26. See note # 13.

27. *Timescling Times*, March 23, 1993, p. 6.

28. "European Packaging Legislation Analysis." Prepared by Resource Integration Systems for Environment Canada, p. 2-4.

29. Ibid.

30. "Economic Instruments and Recovery of Resources from Waste." Prepared by Environmental Resources, Ltd., for the United Kingdom Department of Trade and Industry and the Department of Environment. 1992. The study only briefly evaluates the potential to assign to manufacturers responsibility for all waste management operations, and notes the value of direct cost internalization which would result.

Appendix 1: Implications of the Analysis Beyond Market Development

Although the focus of this project is on market development, the analysis has several important implications for other areas of concern to the Board. These implications are only briefly summarized here. As with all findings, staff is available to more fully assess each of these issues, at the Board's direction.

MANUFACTURER RESPONSIBILITY AND FEE OPTIONS TO PROMOTE WASTE PREVENTION

Some manufacturer responsibility options can be structured to specifically promote source reduction. One option is to craft specific requirements on a product-by-product basis, in a manner similar to minimum content requirements. Possibilities include requiring packaging to be refilled or reduced in weight or requiring durable products to meet specified durability standards. These approaches are subject to the same criticisms as minimum content.

Several manufacturer responsibility options which were not suggested for further consideration could have a significant waste prevention potential. For example, options which assign direct responsibility to manufacturers for disposal or recycling collection programs would directly internalize waste management costs into standard production costs. These options were not suggested for further consideration primarily because they have no direct market development component.

Waste generation fees, as suggested for Board consideration, would provide a direct source reduction incentive to waste generators. A front-end fee system also can be devised to promote source reduction. As with market development, the amount of fee required to achieve a given reduction is not known, and would vary according to many factors. It should be noted that any fee system based on the weight of materials, including the material characterization fee suggested for Board consideration, would provide an incentive for waste prevention; however, this could cause manufacturers to switch to material types that have relatively lower recycling rates. For example, manufacturers using glass packaging may be prompted to substitute plastic, a material that is recycled in California at a lower rate, if fees were based on package weight. Complex consequences suggest that a case-by-case evaluation of specific proposals is necessary.

FUNDING FOR BOARD AND/OR LOCAL PROGRAMS

Each of the fee systems investigated has the potential to generate substantial revenue streams. Board funding alternatives are the subject of a separate staff issue paper, being prepared by the Economic Research and Forecasting Section. This paper is scheduled for completion in Winter 1993. The report will build upon this analysis and provide additional background and analysis relevant to considering

statewide funding mechanisms. Both back-end and front-end fees could provide funding for local or state programs. If assessed by the State, funds could be allocated to local governments based on a variety of criteria, including on a per-ton-recovered basis (as with the Department of Conservation's beverage container processing fee program) or through a system of block grants.

APPLICATION OF TRADABLE CREDITS TO LOCAL DIVERSION MANDATES

Tradable credits policies can be applied to local diversion goals. In this system, jurisdictions would be allowed to comply with the 25% and 50% diversion mandates by purchasing credits from jurisdictions that exceed the mandates. Minimized compliance costs are the main benefit of such a policy. A criticism stems from the fact that rural jurisdictions, with relatively high unit diversion costs, may purchase significant quantities of credits from urban jurisdictions. While this may result in reduced compliance costs in both rural and urban jurisdictions, the result may be perceived as rural jurisdictions funding urban programs.

Appendix 2: Methodology and Assumptions for Section 2

Waste Generation Figures for 1990, 1995, and 2000

The following methodology was used to develop the waste generation estimates for 1990, 1995, and 2000. Due to rounding, attempts to recreate waste generation estimates may be slightly off.

a) Unless otherwise specified below, the Board's Interim Database served as the 1990 baseline (data was current as of May 1993). This data was compiled from local Source Reduction and Recycling Element drafts. Some categories were combined to simplify calculations and presentation. Unless otherwise noted, projected generation for the years 1995 and 2000 is based on baseline generation adjusted on a per-capita basis to account for population increases.

b) 1990 generation figures for all paper types were adjusted using data from a Board contracted study titled *Draft Secondary Materials Market Assessment Study*.[1] This report contains supply and demand estimates for nine secondary materials, including glass, paper, and PET plastic, for 1990, 1995, and 2000.

Paper generation figures from the Board's Interim Database were considerably higher than those from the Market Assessment Study. It was determined that the Interim Database would be used to establish the total baseline generation for paper, but that the tonnage for each grade would be adjusted proportionately to conform to the category definitions used in the Market Assessment Study. This would allow the Market Assessment Study's projections for 1995 and 2000 to be directly compared to the 1990 baseline.

The categories were adjusted by breaking out the Board's category of "high grade paper" into the two categories of "high-grade ledger" and "computer print out," based on their relative generation estimated in the Market Assessment Study. This was consistent with the definitions for each category used in the two sources. Next, the Board's categories of "mixed waste paper" and "other paper" were combined and proportionately reallocated to the Market Assessment Study's "mixed office paper" and "mixed paper" category definitions. Again, this was justified by the definitions for these categories used in each of the two sources.

Generation for all paper types in 1995 and 2000 was derived by multiplying baseline estimates by the rate of growth in potential supply as estimated in the Market Assessment Study.

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[1] R.W. Beck and Jaakko Poyry. Draft Secondary Materials Market Assessment Study. Prepared for the California Integrated Waste Management Board and the Western States Recycling Coalition. Currently under review by Board and other Western States representatives. May 1993.

c) The Board's figure for glass bottles was used in 1990 and was fairly consistent with the Market Assessment Study. Projections for 1995 and 2000 were taken directly from the Market Assessment Study. Again, the identical definitions for glass bottles used in the two sources justified this approach.

d) The Board's category of "ferrous and tin cans" was broken out into "municipal ferrous" using data from the U.S. EPA[2] and "tin cans" using data from the Steel Can Recycling Institute.[3] Consistent definitions and similar tonnage generation estimates justified this process.

Diversion Figures

Unless otherwise specified, 1990 baseline diversion estimates are from the Board's Interim Database. Diversion tonnages for all paper categories and for glass bottles were taken directly from the Market Assessment Study for each year. Due to rounding, attempts to recreate waste generation estimates may be slightly off. Estimated overall paper diversion in 1990 was essentially the same in the Interim Database and the Market Assessment Study; however, tonnages were allocated differently due to varying subcategories within the paper category.

Unless otherwise noted, all remaining 1995 diversion estimates are based on staff assessment of the most "plausible" path to 25% diversion. Diversion tonnages for bi-metal and tin cans were adapted from the Steel Can Recycling Institute and were based on staff considerations of California's recycling infrastructure. Diversion tonnages for municipal ferrous are adapted from the U.S. EPA. Diversion estimates for aluminum cans in 1990 are from the Department of Conservation, Division of Recycling. The high diversion rate of 94% is assumed to be the maximum level achievable and subsequently is held constant in later years.

Diversion rates in 2000 were developed by first assigning 50% diversion to the broadly defined categories of paper, metals, glass and plastics. Staff then identified specific rates for material grades and other materials based on experience and knowledge of California trends. As previously stated, paper and glass bottle diversion estimates are from the Market Assessment Study.

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2 U.S. Environmental Protection Agency. Characterization of Municipal Solid Waste in the United States. Waste generation and diversion figures cited in this study appear in Chapter Two. July 1992.

3 Personal communication. Bill Heenan, Director, Steel Can Recycling Institute. June 1993.

Appendix 3: Summary of Cost-Benefit Analysis of 6 Market Development Policies

The following information is from a recent Board-contracted study conducted by California Futures, Inc.[4] The report developed a model for estimating the net cost or benefit of six specific market development policies. Due to the complex calculations and assumptions, it would be inappropriate to provide the report's conclusions. Interested readers can obtain a copy of the report by contacting the Board at (916) 255-2195. The formula used to determine the net benefit or cost was as follows:

Net Benefit (Cost) = Value of materials collected

+ Net value indirect jobs created

- Net Cost of collection and recycling

- Total additional cost to end-users

- Public administrative costs

- Private administrative costs

The study examined the following specific proposals:

- Utilization rates. (One scenario assumes a 50% rate, another assumes a rate increasing from 50% to 80% over a 6 year period.)
- 15% Refilling of plastic and glass beverage containers, with and without tradable credits.
- 80% recycled content in boxboard and corrugated cardboard.
- 30% recycled content in printing and writing paper.
- Require public agencies to purchase at least 80% municipal solid waste/yard trimming compost or mulch.
- 40% recycled content in plastic industrial containers (pails, crates, drums, cases and pallets), with and without tradable credits.

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[4] "Cost-Benefit Analysis of Six Market Development Policy Options." Prepared by California Futures, Inc. for the California Integrated Waste Management Board. The report was presented to the Board's Market Development Committee on May 12, 1993.

Appendix 4: Summary of Report #4 - Tradable Credit Applications to Integrated Waste Management

INTRODUCTION

This summary consists of three major components: 1) an overview of the theory of tradable credits, 2) case studies of existing tradable credit programs, and 3) possible applications of tradable credit programs to integrated waste management. The first section is simply an overview of the mechanics and attributes that contribute to a successful tradable credit program. The second section reviews programs that have been implemented in the past in an attempt to learn from their failures and successes. The final section attempts to apply tradable credit programs to existing integrated waste management programs and determine the likelihood of the program's success based on the dynamics of tradable credit theory and the lessons learned from the case studies.

OVERVIEW OF TRADABLE CREDITS; A MARKET BASED POLICY

A tradable credit policy assumes that limited amounts of pollution can occur without substantial degradation of the environment. Thus, it is possible to determine an acceptable level of pollution and allow entities the right to pollute up to the acceptable level without incurring penalties. A tradable credit policy requires that the ownership of pollution rights be established so they can be purchased or sold to achieve the most cost effective distribution of resources. To utilize tradable credits, three prerequisites must be fulfilled: 1) A measurable industry goal for pollution reduction must be determined; 2) ownership of pollution rights must be assigned so that responsibility for pollution can be established; and, 3) owners of pollution rights must be able to buy and sell excess credits generated by the reduction of pollution below the limit set for each entity that owns pollution rights.

If a tradable credit program were applied to an integrated waste management objective such as a minimum content requirement, the above prerequisites could be established by: 1) setting an industry goal specifying the amount of secondary material that must be used in a specific product, 2) assigning individual entities the responsibility of using a specific amount of secondary materials, versus virgin materials[5], and 3) allowing those entities with the ability to use secondary materials in excess of mandated levels, to sell the excess to entities unable to achieve their recycled content mandate.

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[5] In the case of minimum content requirements, the right to pollute is synonymous with the right to use virgin materials.

LESSONS LEARNED IN OTHER ENVIRONMENTAL FIELDS

Few tradable credit programs have been implemented and even fewer have been in existence long enough to draw any conclusions regarding the program's success. The following list identifies and briefly outlines examples of implemented programs that incorporated tradable credits programs into their compliance structure:

- In 1982 the U.S. EPA instituted a program to phase-out the use of lead in gasoline. This case is considered the most successful example of a tradable credits program.

- The Dillon Reservoir phosphorous trade program was established in 1984. The program was intended to mitigate environmental damage caused by point and non-point phosphorous discharge into the Dillon Reservoir.

- In 1981 Wisconsin enacted legislation to limit the discharge of waste that increases biological oxygen demand into the Fox River. Only point sources (specifically paper mills and municipal wastewater plants) are regulated.

- The U.S. EPA established an emissions trading program in 1974 to allow greater flexibility to firms trying to comply with the Clean Air Act.

APPLICATIONS TO INTEGRATED WASTE MANAGEMENT

Tradable credits can be applied to three different types of integrated waste management programs: 1) minimum content and other product requirements, 2) utilization requirements, and 3) diversion requirements. The desirability of applying tradable credits to minimum content requirements is strongly dependent upon the particular industry and mandate involved. Tradable credits are not recommended as a compliance mechanism for utilization rate requirements since it would add an unnecessary layer of bureaucracy to the program. The primary benefit of applying tradable credits to local diversion mandates is a reduced cost to achieve the mandate on a statewide basis. Assuming that urban jurisdiction sell credits and rural jurisdictions purchase credits, a drawback would be that this policy could be perceived as rural localities subsidizing urban waste management.

Appendix 5: Summary of Report #5 - Emerging Issues: Global Agreements

Emerging Issues: Global Agreements is the fifth report in the Analysis of Emerging Market Development Options. It explores a series of issues involving the potential for trade laws and agreements to impact California market development legislation.

THE GENERAL AGREEMENT ON TARIFFS AND TRADE & MINIMUM CONTENT LAWS

Issue: Do California's minimum content laws constrain international trade and therefore violate GATT?

California's minimum content requirements for glass containers may be seen as a significant trade barrier by European Community members, according to a Los Angeles Times article. This concern reflects a departure from those usually raised regarding the relationship between international trade and environmental laws. Generally, there are misgivings that US environmental laws render US companies less competitive than those in countries with less restrictive environmental regulation. Only now are questions being asked about whether US environmental laws put foreign companies at a disadvantage in selling to America. Initial analysis indicates that minimum content laws can be devised which promote recycled content without causing violation of GATT or other free trade agreements.

Recommendation:

California should draft its minimum content laws so that foreign producers are not placed at a competitive disadvantage:

(1) Minimum content laws should conform to the non-discrimination provision of GATT Article I, Paragraph 1.

(2) Minimum content laws should be framed so as to allow foreign producers to comply without undue hardship in accordance with Article III.

(3) The laws should not be protective of domestic production to the detriment of foreign production (Article III, Paragraph 5).[6]

(4) Minimum content laws should clearly relate to "conservation of exhaustible natural resources...in conjunction with restrictions on domestic production or consumption." (Article XX:(g))

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[6] Tradable credits would seem to resolve any issue that a minimum content law is in violation of GATT's national treatment clause.

THE GENERAL AGREEMENT ON TARIFFS AND TRADE & "BUY-RECYCLED LAWS"

Issue: **Will expanded "buy-recycled" efforts violate GATT?**

Currently, GATT appears to allow liberal preferences in government procurement. However, suggested amendments to GATT could require more careful crafting of future buy-recycled laws to ensure that they do not exclude foreign producers of recycled-products.

Recommendation:

Draft "buy-recycled" laws in a way which does not exclude foreign producers. For example, the laws should not specify that California secondary materials must be used in any given proportion.

THE NORTH AMERICAN FREE TRADE AGREEMENT & CALIFORNIA MARKET DEVELOPMENT EFFORTS

Issue: **Will the North American Free Trade Agreement impede market development activities initiated by California?**

The North American Free Trade agreement (NAFTA) between the United States, Mexico, and Canada contains an equal enforcement clause to prevent the use of environmental standards to keep out foreign products. That is, any environmental standard must be applied equally to domestic and foreign North American products or packages. Furthermore, the treaty would not limit the severity of any standard if there is scientific basis to the standard. This should mean that California minimum content laws would not be in violation of NAFTA provided they are applied irrespective of the product's or package's place of origin. Thus, NAFTA should not act as a constraint to California's market development activities.

THE BASEL CONVENTION & FOREIGN MARKETS FOR SECONDARY MATERIALS

Issue: **How does the Basel Convention affect the ability of California to market secondary materials overseas?**

It would appear that the Basel Convention applies very little to the trade of scrap (i.e., secondary) materials between nations. The Convention was convened to address concerns that wealthy countries were exploiting less wealthy countries through trade in both hazardous and municipal solid waste. The Convention regulates the ability of wealthy countries to export their waste to poorer countries for disposal. Trade in scrap differs from trade in waste because the importing country (whether rich or poor) pays the exporter for the scrap. Because there is a commodity exchanged that has a positive value for the importing country, there is less concern over inequity.

THE COMMERCE CLAUSE OF THE US CONSTITUTION & INTERSTATE MOVEMENTS OF WASTE

Issue: **How does the Commerce Clause of the US Constitution affect interstate waste movements?**

The Commerce Clause of the US Constitution mandates open trade between states and prohibits state laws restricting such trade; however, the Clause is not absolute. Laws restricting interstate trade have been found constitutional if the legislation can be shown to reflect legitimate local concerns and if its impact on interstate commerce is incidental.[7]

THE SHERMAN ANTI-TRUST ACT & JOINT MARKETING OF SECONDARY MATERIALS

Issue: **Does the Sherman Anti-Trust Act present a hinderance to communities jointly marketing recovered materials?**

Provision can be made in state law to protect local governments from risk of anti-trust violation if they jointly market recovered materials. The key here is the nature of the state authorization. The authority can be broad and general as long as it is fairly explicit.[8]

Recommendation:

Seek an amendment to the Public Resources Code to authorize local governments to jointly market the materials they or their agents recover from the waste stream as part of the effort to achieve the IWM Act diversion requirements. The amendment might be made even more specific by authorizing, in particular, joint marketing arrangements planned for in the local governments' approved source reduction and recycling elements.

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[7] This was the basis for a court finding upholding a Maine law banning the importation of live bait. The law was meant to protect native fish from parasites that imported live bait might harbor. The Supreme Court accepted this as a legitimate local purpose.

[8] This analysis is based on a conversation with Thomas Greene, Esq., attorney in the Anti-Trust Division of the California Attorney General's Office.

FREE SPEECH & ENVIRONMENTAL LABELING[9]

Issue: **Is California's environmental labeling law constitutional?**

Judge Marilyn Hall Patel, US District Court in San Francisco, upheld a 1990 California law that regulates the terms "recycled" and "recyclable." The decision came in a case in which ten manufacturing and trade associations filed suit to have the law declared unconstitutional on the basis of infringement of free speech. The decision struck down the law's definition of "recyclable" for being too vague. The law was found to lack sufficient guidance regarding the criterion that there must be "convenient recycling" opportunities before a package could be labeled "recyclable."

Conclusion:

The court concluded that section 17508.5 permissibly restricts commercial speech, and that, except for subsection (d), the definition of "recyclable," the statute is not unconstitutionally vague on its face. The court granted partial summary judgment for the plaintiff solely with respect to subsection (d), striking that section as unconstitutionally vague.

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[9] The material for this issue paper was provided by attorney for the Board Maureen Carr Morrison.