Final Report of the Dialogue on Sustainable Financing of Recycling of Packaging at the Municipal Level

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The Keystone Center

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Table of Contents

Executive Summary

The Dialogue on Sustainable Financing of Recycling of Packaging at the Municipal Level was a multi-stakeholder, cross-sector dialogue convened by the U.S. Environmental Protection Agency (EPA) at the request of several state government agencies.

Scope and objectives

The dialogue focused on packaging and printed materials found in the municipal waste stream from households, businesses, institutions, and locations away from home. Long-term goals included:

- Optimization of existing components of the recycling system.
- Identification of mechanisms to address shortfalls in the current recycling system – including the need for long-term financing – and opportunities for fully utilizing the existing value chain.
- Maximization of the source reduction, collection, reuse, and recycling of packaging and printed materials.

EPA enlisted the help of The Keystone Center (www.keystone.org) in convening and facilitating the dialogue, and assisting stakeholders in developing the contents of a publicly available report with the following major components:

1. A set of proposed projects to advance the goals set out above, including estimates of the resources required, a timeline, and expected benefits for each project.
2. Evaluations of key strategies for financing of systems to recycle packaging from consumer packaged goods as well as printed materials. Evaluations are informed by perceived advantages and disadvantages, and represent a balanced summary of participants' views regarding a given strategy's potential to align with the traits of a successful system (as envisioned by the dialogue group).

Participants held a wide array of preferences regarding the optimal scope of the deliberations, and discussion regarding the focus and parameters continued for approximately the first half of the project. The major topics that generated discussion and illustrated divergence among stakeholders included:

Extended Producer Responsibility
Many participants would have preferred to focus largely or exclusively on certain financing strategies they believed to be most promising, especially extended producer responsibility (EPR). At least some stakeholders believe the dialogue missed a critical opportunity for productive deliberation and cross-sector learning by not pursuing deeper analysis of EPR.

Materials
Some participants believed that inclusion of printed paper in the scope of inquiry was inappropriate since relevant industry sectors (e.g., paper manufacturing, printing and publishing) were not represented at the table. Alternatively, a few participants preferred a focus on priority material types (e.g., aluminum, cardboard, steel) rather than all forms of packaging.

Dedicated focus on recycling
Some participating stakeholders – largely from industry – raised concerns about the focus on recycling and advocated for a more holistic assessment of end use options, hoping to explore how best to maximize the recovery of value (in financial and environmental terms) from the municipal solid waste stream. They preferred to be able to consider an integrated waste management approach including composting and waste-to-energy, determining the appropriate management strategy for each set of circumstances. Also, some participants from various sectors emphasized the need for source reduction and reuse to play a more significant role.

The purpose of the project was to solicit a range of stakeholder opinion and identify promising options rather than attempt to achieve agreement among participants. **This report therefore does not represent consensus views but rather serves as a summary of deliberations, including findings and some jointly developed recommendations.**

Participants

The dialogue convened a representative group of key stakeholders: ten consumer packaged goods companies, two retailers, seven state governments, five local governments and six non-governmental organizations. This configuration was intended to ensure the inclusion of perspectives from brand owners associated with the majority of packaging used for products consumed in the home, national retail chains that sell their own private label products, states with different geography, population diversity and deposit laws; and a broad range of experience domestically and internationally with diverse approaches to financing for recycling.

The Dialogue Process

The initiative began with interviews of key stakeholders in the summer of 2010 to test the scope, gather background information and anticipate perspectives and interests. The process included four in-person meetings – in September and December 2010, and January and April 2011 – and intensive workgroup activity to develop substantive drafts for deliberation by the full participant group. Participants also spent time developing a shared base of knowledge through webinars on specific topics (including financing systems in other markets, and the infrastructure of materials recovery and processing in the U.S.), cross-sector learning through question-and-answer exercises between brand owners and public sector participants, and a mapping exercise to understand the basic

components and their relative strengths and challenges within the current system. The map included input from participants' professional perspectives on the different phases of the system: package design, product distribution/retail sales, consumer generation, collection, and sorting (including the materials market, composting, landfill and combustion with energy recovery).

To further set the stage for optimizing the existing system and analyzing potential financing strategies participants discussed the characteristics and objectives of an effective recycling system for packaging and printed material. A successful system should:

1. Provide consistent and accurate consumer education that increases participation and drives quality results.
2. Provide wide access to recycling opportunities (including underserved and non-residential).
3. Reflect lifecycle/system based thinking (from initial package and printed material design to end of life management) and take into account relevant environmental and public health benefits/impacts.
4. Foster a system-based approach that is flexible and consistent across jurisdictional boundaries.
5. Establish and meet clear performance measures.
6. Produce marketable commodities and foster innovation that serves to improve quality and efficiency.
7. Be economically self-sustaining, improve efficiency and enable cost control.
8. Incentivize all participants in the system to maximize efficiency and recovery for recycling.
9. Ensure feedback loops across the system (e.g. product design, waste collection, after market channels).
10. Ensure clear recognition and allocation of roles and responsibilities.

From these traits, participants also developed criteria for evaluating financing strategies. The assessment exercise considered each strategy's potential to:

- Achieve financial sustainability – Providing reasonably secure, sufficient, stable and ongoing financial resources; contributing to a long-term solution; and ensuring that funds are used for the intended purpose.
- Positively affect the value chain and associated communication and action – Ensuring feedback loops across the system (e.g. product design, waste collection, after-market channels) to resolve current market disconnects; incentivizing consumers effectively; influencing consumer behavior in needed ways; improving recycling rates; incentivizing innovations in packaging design and processing technology; encouraging markets for recycled materials; allowing clear recognition and allocation of roles and responsibilities.
- Enable efficiency and cost control – Operating efficiently and reducing total system costs in the long run; improving the efficiency of the recycling system; controlling costs.

- Maximize consistency, reach and scalability – Implementing consistently across jurisdictions; reasonably accommodating the full array of consumers (e.g. single-family, multi-family, commercial and away-from-home sources and underserved communities).
- Achieve satisfactory ongoing performance – Generating measurable performance data; producing high-quality commodities; demonstrating sufficient flexibility to allow for improvements in technology.
- Feasibility – Garnering support from consumers, retailers, brand owners and elected officials (political feasibility).
- Degree of impact on the present challenges with financing.
- Likely cost in relative, qualitative or quantitative terms.

Work Products

Participating stakeholders identified, examined and evaluated a total of eleven strategic options for financing recycling of packaging and printed material, and also proposed the advancement of eight distinct projects to optimize the current system. Together, these two work streams considered opportunities for enhancing the funding available to the system while reducing the cost of the system's operation.

Strategies for Financing Recycling

The assessments were intended to provide a balanced summary of participating perspectives regarding the advantages and disadvantages of each strategy, providing a strong foundation for leaders in the public, private and civic sectors to determine how best to address the challenge of financing recycling. The strategies are categorized by general source of funding: producers, consumers, rate-payers, and taxpayers.

- Producer-funded strategies
    1. Cost internalization
    2. Partial cost internalization
    3. EPR Eco-Fees
- Consumer-funded strategies
    4. Product-based advance disposal fees
    5. Deposits and unclaimed deposits
- Rate-payer funded strategies
    6. Fees at time of recycling
    7. Subscription service
    8. Incentives
- Taxpayer-funded strategies
    9. Taxpayer-funded
    10. Tax credits or other financial incentives
    11. Federal funding for recycling infrastructure

Participants defined and reviewed each strategy, deliberated about its potential to support an effective system and, in some cases, noted conditions for success or clear synergies with other strategic approaches. The dialogue group was not tasked with ranking or prioritizing the strategies or with reaching consensus on a preference. Opinions varied widely on several of the options. Stakeholders observed that many of the strategies could not be utilized productively in isolation but would need to be implemented in conjunction with other financing strategies.

Strategies for Optimizing the Current System

Eight potential projects were identified as strategies for improving the effectiveness and efficiency of the existing recycling system, to meet the characteristics of success that the group discussed. The projects evolved out of the mapping exercise through which participants identified challenges or areas for improvement at each phase of the system. Participants jointly developed a set of project briefs – including the purpose, objectives, expected results, metrics, work plan, and identification of who needed to take action – to address those challenges.

Projects included:

1. Package design and material collection/recovery – To provide package designers with information and a feedback loop that will enable material recovery by identifying existing design for recycling guidelines, gaps in available resources for design guidance, ways designers can be incentivized to follow guidance, and material and format trends in the U.S. for growing and underserved material streams.
2. Recycling incentives – To identify recycling incentive programs/strategies proven to significantly increase consumer participation, describe relevant program design attributes, and identify enablers and barriers to success.
3. Consumer education program – To develop a model multi-stakeholder public education program that is effective by gathering existing research (or conducting new research), identifying messages that influence behavior, and developing and piloting a consumer education program.
4. Material collection – To provide a comprehensive analysis of the strength and weaknesses of the existing collection system, recommend methods to address issues or steps that need to be taken, define best practices, and recommend potential sources of financing for optimizing collection.
5. Material sorting – To identify steps to improve the effectiveness of material sorting by assessing sorting practices and technology to pinpoint interventions that could increase throughput, yield, quality and value, accommodate new materials and reduce cost.
6. Aftermarkets – To foster utilization of recovered packaging materials, providing an online database of recovered and/or processed materials available for use.
7. Aftermarkets – Benchmarking recycling rate by material, to provide consistent, transparent and broadly-supported data on material recycling rates for specific

commodities by conducting a national survey of and allow calculation of relevant recycling rates.

8. System decision-making – To produce a model of decision-making by analyzing current decision-making process and identify opportunities and barriers that affect optimization of the system.

Final Observations

The dialogue was not intended to solve every relevant challenge or build agreement on an optimal solution, individuals came to the table with diverse hopes and expectations for the focus and outcome, and many participants would have preferred deeper and more detailed analysis of potential strategies than available time and resources allowed. However, participating stakeholders generally gained a fuller understanding of the overall recycling system, the challenges facing its current configuration, and the perspectives of other key stakeholders on the range of options available for overcoming those challenges. This enhanced understanding together with the consequent development of new avenues of communication and interactions can allow for future efforts to move further toward sustainable financing for recycling of packaging and printed material at the municipal level.

I. Introduction and Background

This report constitutes the work product of The Dialogue on Sustainable Financing of Recycling of Packaging at the Municipal Level. At the request of several state and local governments, the U.S. Environmental Protection Agency (EPA) convened this multi-stakeholder initiative in summer 2010 to address financing challenges confronting recycling of packaging waste. This dialogue represented a significant opportunity to identify ways to reduce packaging waste, increase recycling, and reduce the overall impact of packaging materials on the environment.

Scope and objectives

The dialogue focused on packaging and printed materials found in the consumer waste stream from households, businesses, institutions, and locations away from home.

Goals of the project included:

- Optimizing existing components of the system for recycling.
- Identifying mechanisms to address shortfalls in the current recycling system – including the need for long-term financing – and opportunities for fully utilizing the existing value chain.
- Maximizing the source reduction, collection, reuse, and recycling of packaging and printed materials.

Impetus for the dialogue

In July 2009, several state government agencies wrote to EPA asking the agency to consider convening a multi-stakeholder dialogue to explore sustainable financing strategies for recycling at the municipal level. The letters consistently stressed the need for a system of financing that alleviated the burden on local recycling programs that currently serve as the backbone of sustainable materials management in the U.S. The state agencies expressed concern that such programs will fall short of their potential to deliver benefits such as job creation, conservation of resources and energy, and greenhouse gas reduction, if they continue to rely solely on local funding sources that are severely limited and subject to many competing demands. The letters posited that community recycling programs generally are stagnating at a time when the commodity industries have become more dependent than ever on recovered materials. Furthermore, the principal supply base of those recovered commodities is an infrastructure financed by local government with little ability to expand, threatening the sustainable use of materials in the U.S. and around the world. The state agencies noted the emergence in other markets of "viable alternatives to building a sustainable materials economy that depends on the local tax structure," and that such alternatives can lead to increased recycling rates and improved efficiency in local programs while providing commodities and helping to

meet the needs of consumer product companies moving to more environmentally sustainable packaging. A sample letter is included with this report as Appendix A.

Subsequent presentations by state and local government representatives at in-person meetings of the participant group provided a more detailed characterization of the nature and scale of the current challenges in financing recycling at the municipal level. Those presentations noted:

- Packaging comprises nearly a third of the U.S. municipal solid waste stream, and continues to grow in volume and material complexity (e.g., composites, films, bio-based). The cost of managing packaging waste continues to increase and falls largely on the public sector. Containers and packaging generation increased by 13 million tons since 1990, adding $1.56 billion in cost to government.[1]
- Municipal recycling programs do not adequately address all sources of packaging materials generated, including commercial, institutional, and away-from-home locations.
- Recycling rates generally have been stagnant for the last decade, with approximately 30% of the waste stream captured for purposes of recycling.
- An opportunity exists to recover valuable materials from used packaging for use as raw material inputs in the remanufacture of consumer products.
- Government budget pressures discourage any new taxes or fees, and require recycling to compete with critical services (e.g., schools, libraries, police, and emergency response) for resources. Budgeting process constraints include varying conditions each year, challenges with long-term planning and consistent implementation, and inelasticity with regard to commodity pricing. In a 2010 survey, 70% of responding local recycling coordinators throughout the U.S. indicated that their agency or program had suffered recent budget cuts due to the ongoing recession, and of those, 61% noted that the cuts included staff reductions.[2]
- The system's reliance on local decision-making results in a patchwork approach that is inconsistent across jurisdictions, and largely constrained to short-term, compartmentalized (rather than holistic) analysis and planning. Programs lack consistency in materials collected, scale and impact of education and outreach investments, and standards and processes employed.

The public sector stakeholders observed that the party responsible for waste management (local government) has no or little ability to influence volume or composition of materials, or to affect materials markets. The current, government-funded system suffers from inherent constraints, market dislocations (the inability to control costs and address systemic problems), an unsustainable resource base (e.g., disposal fees, property taxes), and lack of sufficient resources for capital expenditures, program expansion, and outreach and education. Greater harmonization would facilitate public participation,

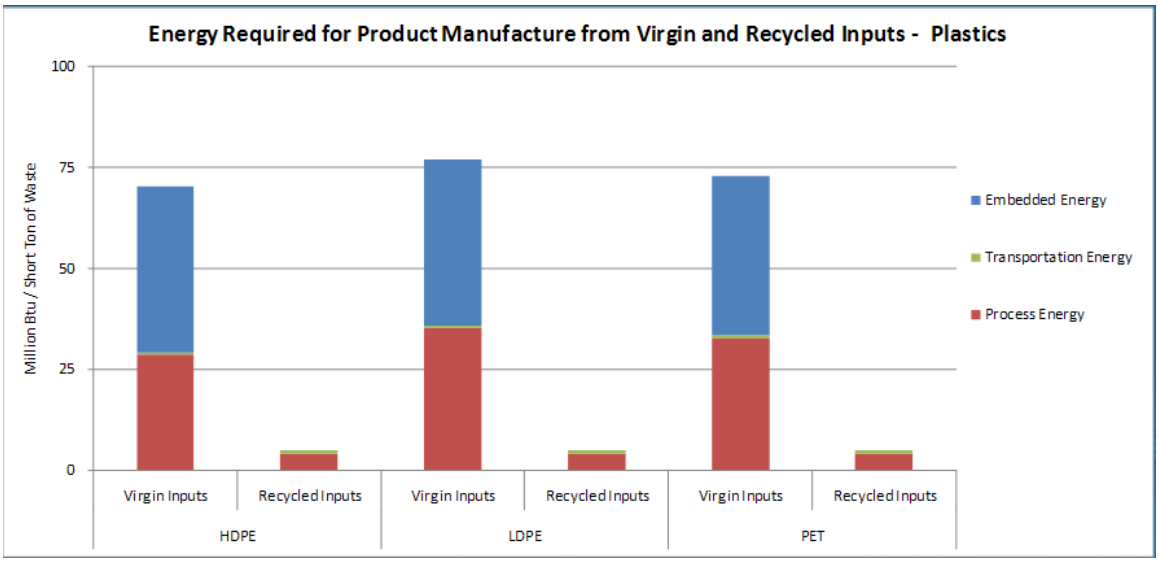
[1] EPA, "Municipal Solid Waste in the US, 2007 Facts and Figures" (EPA 530-R-08-010, November 2008), http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw07-rpt.pdf

[2] Henry Leineweber, "What's Eating Recycling Coordinators," Resource Recycling, December 2010: 19-22.

align programs with market demand, and enhance economies of scale. Additional resources are needed to:

- Modernize existing collection programs;
- Make strategic investments to resolve market disconnects;
- Greatly bolster away-from-home collection;
- Address multi-family and non-residential collection needs;
- Address gaps in providing infrastructure;
- Capture new materials;
- Improve the processing capacity of materials recovery facilities (MRFs);
- Establish effective incentives for program participation;
- Improve outreach and education;
- Ensure compliance; and
- Ensure data collection and reporting.

The call for dialogue implicitly asserted the importance of sustaining and expanding recycling efforts in the U.S. There is ample data demonstrating that using recycled inputs conserves energy over using virgin inputs. For example, making an aluminum can from recycled aluminum requires 95% less energy than making a can from virgin feedstocks.[3] Making plastic packaging from recycled feedstocks not only reduces energy demand in manufacturing, but it also eliminates consumption of valuable petrochemical resources.

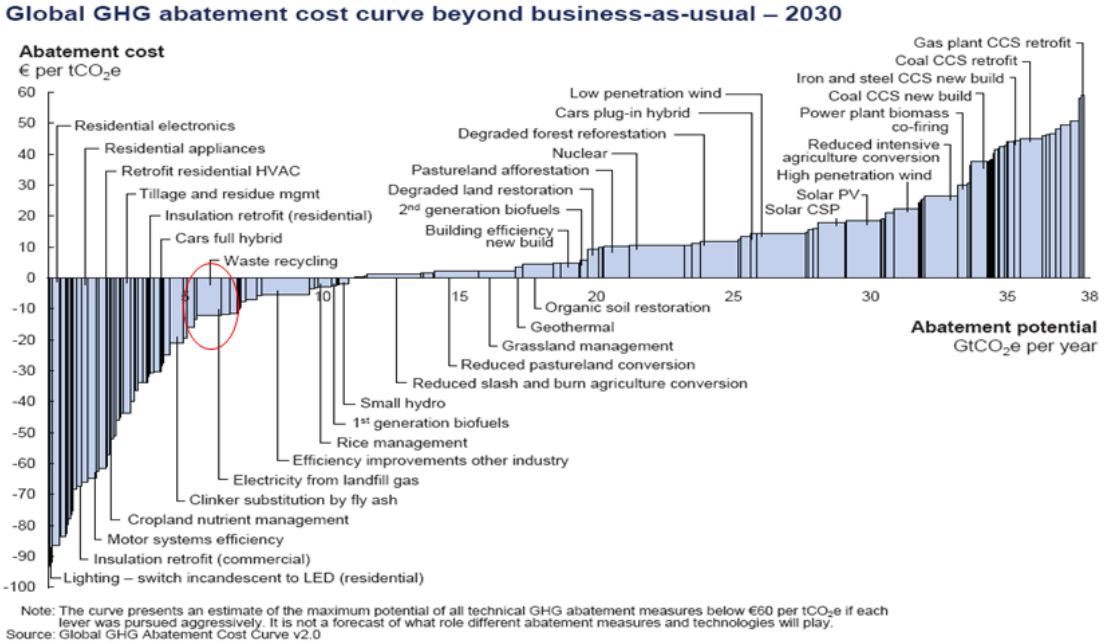


Manufacturing with recycled inputs also reduces greenhouse gas (GHG) emissions – for example, in 2009, we recycled 82 million tons of MSW in the US, avoiding emissions of 178 million metric tons of carbon dioxide equivalent[4] (about 3% of the total US GHG

[3] Data from EPA's Waste Reduction Model (WARM), version 11. http://epa.gov/warm

[4] EPA, "Municipal Solid Waste in the US, 2009 Facts and Figures" (EPA530-R-10-012 December 2010), http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw2009rpt.pdf

emissions for the same time period)[5]. Further, a recent study has shown that recycling is an extremely cost-efficient GHG abatement strategy:



[6]

Recycling also contributes to growth in green jobs and state revenues – one recent study concluded that the recycling industry in South Carolina grew from 26,537 employees in 1995, to a total of 37,440 employed in 2005 with $6.5 billion in economic impact, contributing $69 million in state tax revenues.[7]

Participants

The letters from state government agencies to EPA requested that the dialogue involve representatives of state and local government, not-for-profit advocacy organizations, and the manufacturers of products and packaging that are managed in the municipal recycling stream. EPA identified and invited key stakeholders in consultation with the facilitators. The size of the participant group was kept relatively small to better manage a focused and time-bound set of deliberations, and to encourage candid and creative dialogue.

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[5] EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007" (EPA430-R-09-004, April 2009). http://www.epa.gov/climatechange/emissions/usinventoryreport09.html

[6] McKinsey & Co, "Pathways to a Low-Carbon Economy; Version 2 of the Global Greenhouse Gas Abatement Cost Curve", January 2009. http://globalghgcostcurve.bymckinsey.com/

[7] EPA, "The Economics of Recycling in the Southeast: Understanding the Whole Picture" http://epa.gov/region4/waste/rcra/mgtoolkit/economic.html

Participants ultimately included representatives of ten consumer packaged goods companies, two retailers, seven state governments, five local governments, three environmental public interest organizations and other non-governmental organizations. The consumer packaged goods companies represented food, beverage, health and beauty, and home cleaning products, ensuring that the majority of packaging used for products consumed in the home would be represented at the discussion table. Those brand owners sell their products in international markets, and brought to the deliberations the benefit of their experience with financing for recycling systems in other countries. Retailers represented large-scale national chains that also make and sell their own private-label products and have a demonstrated interest and involvement in addressing packaging issues. Participating state and local government agencies represented geographic and population diversity, including states with and without container deposit laws, and brought a range of experience of and knowledge of various recycling, financing, and incentive programs. (Local government representatives included both city and county interests.) Non-governmental organizations brought a wide variety of experiences working for more sustainable management of packaging.

EPA officials participated as observers, providing occasional technical assistance upon request. Funding for the project was supplied entirely by EPA.

Participation in the dialogue was by invitation only, although meeting summaries were made publicly available. A full list of participants and federal observers accompanies this report as Appendix B.

Task of the dialogue group

EPA asked participating stakeholders to produce a publicly available report with the following major components:

1. A set of proposed projects to advance the goals set out above, including estimates of the resources required, a timeline, and expected benefits for each project.
2. Descriptions of key strategies for financing of systems to recycle both packaging from consumer packaged goods, and printed materials. The description of each strategy will be accompanied by perceived advantages and disadvantages, a balanced assessment of the strategy's potential for aligning with the traits of a successful system (as envisioned by the dialogue group), and an outline of information needs going forward.

About this report

This report was assembled and edited by the dialogue's facilitators, provided by The Keystone Center (www.keystone.org). The report summarizes the participant group's deliberations, characterizing perspectives shared during meeting discussion – including notable convergences and divergences – and presents all jointly developed

recommendations. *This document does not represent or describe a consensus among participating stakeholders, since consensus was not the goal of the project.* However, levels of agreement were assessed at many points and are characterized in this report. Viewpoints are not attributed to individuals, although occasionally the source of a perspective is identified by sector.

Since this report serves as the dialogue's ultimate work product, it consolidates a good deal of written content – especially work group output – produced by participants throughout the course of the project. While some revisions to format and structure were made in incorporating that written material, the substance of the report – including both areas of agreement and disagreement – stem directly from the stakeholders' deliberations.

II. The Dialogue

Project format and protocols

During the summer of 2010, facilitators interviewed the invited participants to assess stakeholder perspectives on the defining problem, inquire about lessons learned from existing systems and programs throughout the U.S. and in other markets, note various visions of an optimal system in the U.S., and solicit suggestions for a successful multi-lateral dialogue on sustainable financing.

Four in-person meetings of participating stakeholders were held in Washington, DC – in September and December of 2010 and January and April of 2011. Informational webinars occurred between meetings to add to the group's knowledge base. Two workgroups were formed to conduct more in-depth deliberation on specific topics and to draft text for the full group's consideration. One work group focused on identifying opportunities for optimizing existing system components, and the other on assessing a range of strategies for financing the overall system. The meeting summaries and the webinar presentations can be found at:
http://www.epa.gov/conserve/smm/sfmr/packaging.htm

Participants were asked to adhere to the following protocols:

- Respect the collaborative process of dialogue and participate in good faith.
- Comments made during meeting discussions were off the record and not for attribution. Participants were free to share their personal views and ideas regarding the dialogue with others outside of this process, but not to quote one another or characterize others' views outside of the meeting.
- Participants were understood as representing the interests of their organization of affiliation or constituency, but strongly encouraged to voice their personal views and not restrict themselves to institutional positions during discussion.

Information sharing

Recognizing that the dialogue faced a challenge of imperfect information (for example, regarding the performance and progress of various programs) and that participants represented a wide diversity of experiences and domains of expertise, several means were employed to broaden the shared base of knowledge.

Cross-sector learning

State and local government representatives responded formally in depth to several questions posed by brand owners regarding information points such as typical cost items in a recycling system, priority financial issues in the current system, and how additional resources might be allocated.

Brand owners presented information about classification, concentration, ownership, productivity, and technological capabilities of MRFs from a study recently commissioned by the Grocery Manufacturers of America.

Informational webinars

The facilitators and EPA also convened five webinars to supplement the in-person meetings of the dialogue. Topics and presenters typically were suggested by dialogue participants. The webinar served as optional, informational sessions, intended as opportunities for the ongoing deliberations to benefit from information requested by several participants about notable programs and systems. Each session is described below very briefly; presenters' names and affiliations are provided, along with electronic links to on-line copies of the presentations given.

The first session focused on understanding approaches to financing and other related dimensions of recycling programs in the Canadian provinces of Ontario and British Columbia. Presenters were asked to provide an overview of financing and management for specific programs in question, describe successes and challenges, means by which targets were established, analysis of overall effectiveness, and any information available regarding the disposition of materials collected, per capita waste generation as well as recovery of materials under the program, the costs associated with different recovery rates, and recycling rates (i.e., costs, metrics). Presentations included:

- Overview of EPR for packaging – Derek Stephenson, President, StewardEdge
- Historical overview of EPR for recycling in British Columbia – Ron Driedger, Executive Director, BC Used Oil Management Association
- Current snapshot of product stewardship in British Columbia – Kris Ord, Manager, Community Waste Reduction, British Columbia Ministry of Environment
- Case study of EPR for packaging in Ontario – Derek Stephenson, President, and Mustan Lalani, Analyst, StewardEdge

The second session began with a broad overview of collection and sorting from a waste hauler/management perspective, anticipating what is on the technology horizon and suggesting opportunities for and potential barriers to recycling more packaging. The second provided an overview of issues in processing (post-MRF) plastics used for packaging. Presentations included:

- Recycling at the MRF – Richard Abramowitz, Director of Public Affairs, Waste Management Recycle Affairs
- Plastic Recycling: A Snapshot on Markets, Technology, and Trends – Keefe Harrison, Director of Communications, and Liz Bedard, Director of Rigid Recycling Plastics Program, Association of Post-Consumer Plastics Recyclers

The third session featured detailed overviews of the approaches to financing and management of EPR recycling programs in Austria and Belgium, as well as well as

lessons learned thus far in execution of those systems, how and by whom targets were/are established, information on the disposition of materials collected, and information on both waste generation and recovery of materials under the programs. Presentations included:

- ARA: Producer Responsibility Put into Practice – Christoph Scharff, CEO and President of ARA Altstoff Recycling Austria
- Fost Plus – William Vermeir, Managing Director of FostPlus in Belgium.

The fourth session provided a European perspective of EPR in practice, with specifics on the inception and growth of the different EU EPR schemes, and considerations for financing of a packaging recovery system. The session also provided a review of market conditions for packaging materials, including domestic collection and exports. Presentations included:

- European Perspective on EPR – Jane Bickerstaffe, Director, The Industry Council for Packaging and the Environment (INCPEN)
- Packaging Recycling Markets – Jerry Powell, Executive Editor, Resource Recycling

The fifth session provided data, perspective and strategies for energy recovery from end-of-life packaging materials. Presentations included:

- Energy Recovery: A Viable Resource Management Option – Jeff Wooster, Plastics Sustainability Leader, The Dow Chemical Company

Formation of and charge to work groups

Two diverse, cross-sector work groups were formed to develop draft work products for review and discussion by the full plenary group. These cross-sector work groups were limited in size with the understanding that all participants would have an opportunity to comment on and help refine the work products of those groups. Participants worked together to determine the respective charges to the work groups, while remaining consistent with the dialogue's prescribed scope.

The Financing Strategies work group was charged with identifying and assessing key options for financing the overall system for recycling of packaging and printed material at the municipal level. In accordance with project objectives, participants were asked to develop balanced analyses of each strategy, but not to rate or prioritize them in any way. It should be noted that the financing strategies work stream was not tasked with developing recommendations for future action, although many participants would have preferred such a charge.

During the early months of the dialogue, all participants also undertook to map out the basic components of the current system of managing packaging waste from consumer

products in a preliminary effort to share perspectives on what aspects of that system are and are not working well. This collaborative exercise served as an internal information-gathering activity, and enhanced the group's collective understanding of challenges and opportunities within the existing system. Participants considered the following basic components and sequence of the system: package design, product distribution / retail sales, consumer generation, collection, and sorting (including the materials market [recycling], composting, landfill, and combustion with energy recovery). Individuals were asked to provide input from their own professional perspectives (e.g., material, technology, policy, infrastructure, consumer behavior, and economic issues), specific to management of packaging.

Based on plenary discussion of this mapping exercise, the plenary group identified priority opportunities for optimizing components of the existing system. The Optimization work group was then established to develop "project briefs" – implementable recommendations – for those opportunities. The whole group also brainstormed key strategies that merited exploration as options for financing a recycling system, and based on this list the Financing Strategies work group was formed.

Participant perspectives regarding the scope

While stakeholder participation was robust and consistent throughout the dialogue, several participants suggested significant adjustments to the scope of the project. Such adjustments were generally not feasible due to the necessity of adhering to the original purview given time and resource constraints, and, in some cases, due to contrasting preferences among participants.

Materials

Most participants supported the decision to include printed material in the scope of discussion, believing that high-level strategies appropriate for packaging would likely be applicable to printed material as well. However, some participants believed such inclusion was inappropriate since relevant industry sectors (e.g., paper manufacturing, printing and publishing) were not represented at the table.

A few participants suggested that the scope should focus on priority material types (e.g., aluminum, cardboard, steel) rather than all forms of packaging.

Dedicated focus on recycling

Several participating stakeholders – largely from industry – raised concerns about the implicit assumption of recycling as the single waste management solution to be addressed. Some of those individuals advocated for a more holistic assessment of end use options, exploring how best to maximize the recovery of value (in financial and environmental terms) from the municipal solid waste stream. They preferred an expanded zone of inquiry that would have allowed an integrated waste management

approach including time devoted to composting and waste-to-energy, determining the appropriate management strategy for each set of circumstances.

Extended Producer Responsibility

Many participants would have preferred a narrower focus on those financing strategies they believed from the outset to be most promising, especially extended producer responsibility (EPR). The facilitators acknowledged at the project's beginning that EPR was highly relevant to the dialogue but not the sole intended focus and not specified in the official written scope of inquiry. Several individuals from various sectors – including state and local government and environmental NGOs – would have preferred a more explicit, results-oriented focus on EPR. Based on these participants' prior evaluations of many of the extant and potential approaches (in Europe, Canada, and – for other parts of the waste stream in the U.S. – they believed EPR to be the most promising strategy for remedying the current financial challenges confronting recycling. Many of those individuals hoped for and expected a more sustained focus on and deeper analysis of EPR.

Some participants, however, including most brand owner representatives, expressed strong discomfort with any explicit emphasis on EPR. A handful of stakeholders expressed the view that EPR was in fact too broad a subject given the need for meaningful and near-term action, and that a somewhat narrower but still reasonably holistic focus on sustainable waste management – i.e., end-of-life management of key materials – would be most productive. The chapter below on Financing Strategies provides more detail on the group's deliberations and stakeholder perspectives regarding EPR and other strategic options.

After early deliberations among participants, EPA confirmed the breadth and boundaries of the intended scope.

Traits of an effective system

Participants discussed at length the characteristics and objectives of an effective recycling system for packaging and printed material. After significant deliberation, stakeholders jointly identified the following traits to guide the dialogue and to inform future efforts to improve the system. A successful system should:

1. Provide consistent and accurate consumer education that increases participation and drives quality results.
2. Provide wide access to recycling opportunities (including underserved and non-residential).
3. Reflect lifecycle/system based thinking (from initial package and printed material design to end of life management) and take into account relevant environmental and public health benefits/impacts.

4. Foster a system-based approach that is flexible and consistent across jurisdictional boundaries.
5. Establish and meet clear performance measures.
6. Produce marketable commodities and foster innovation that serves to improve quality and efficiency.
7. Be economically self-sustaining, improve efficiency and enable cost control.
8. Incentivize all participants in the system to maximize efficiency and recovery for recycling.
9. Ensure feedback loops across the system (e.g. product design, waste collection, after market channels).
10. Ensure clear recognition and allocation of roles and responsibilities.

III. Strategies for Financing Recycling

Introduction

The Financing Strategies workgroup was charged with:

1. Comparing a list of financing strategies identified by the plenary group with the traits of an effective system, also ideated by the group. The financing strategies were chosen for evaluation of their potential to achieve, or help achieve, sustainable financing for recycling of packaging and printed material at the municipal level.
2. Further defining those strategies and supplying examples to illustrate important variations of each for purposes of the dialogue.
3. Listing the relative advantages and disadvantages of each based on input solicited from dialogue participants, and preparing balanced assessments of the strategies.

The workgroup considered the list of possible financing strategies, adding basic information including a description, examples, funding and managing responsibilities. Working from this matrix of basic information, the larger participant group provided perspectives on the advantages and disadvantages of each strategy. Workgroup members used that compiled input to prepare an initial draft assessment of each strategy. Authors used criteria prepared by the workgroup, which was drawn from the participant group's definition of sustainable financing and traits of an effective system, to assess each strategy. The assessments were reviewed and revised at the workgroup level, discussed during a plenary session, and revised again based on that discussion and subsequent written input.

Context and caveats

- The assessments are not intended as deep analysis. They were prepared using participants' volunteer efforts, limited time, and accordingly with a relatively preliminary review of the issues. While empirical data is cited in many instances, the assessments should be understood as the product of collaborative negotiation among stakeholders representing a diversity of perspectives, interests, sectors and disciplines. Also, while participants had multiple opportunities for providing written input, they only enjoyed one opportunity (at the fourth and final meeting) for in-person discussion of the assessments in draft form.
- Most of the strategies are not stand-alone approaches to sustainable financing; in many instances they would need to work in conjunction with other complementary strategies or with an optimized system.
- The overall approach of the exercise combined practical and aspirational analysis. While each assessment addresses issues of feasibility, participants were asked to focus mainly on a given strategy's potential to fulfill the identified criteria if implemented rather than on the likelihood of implemented.

- The assessments are intended as multi-lateral, balanced evaluations of each strategy rather than as advocacy pieces. The array of perspectives among the participant group is represented within each assessment.
- It is recognized that each strategy if implemented does not operate in vacuum and would have effects on the existing system; however the analysis does not extend to anticipating those effects.

The following assessments reflect a range of views expressed by participants of the dialogue. For the most part, the review process resulted in responses to each criterion that incorporated the range of views expressed among the participant group; in a few instances a dual response format was used to accurately reflect divergent views.

The assessments are organized by major sources of funding. The first contain those which are primary funded by producer, including Full Cost Internalization, Partial Cost Internalization, and Eco-Fees. Strategies primarily funded by consumers follow, containing Advance Disposal Fees, and Deposits and Unclaimed Deposits. The third section contains assessments that are primarily funded by ratepayers and include Fees at the Time of Recycling, Subscription Service, and Pay-as-You-Throw. Those that are funded by taxpayers conclude the section, including Taxpayer-Funded, Tax Credits and other Financial Incentives, and Federal Funding for Recycling Infrastructure.

Those participants serving as contributing authors were asked to assess a given strategy's potential to: achieve financial sustainability; positively affect the value chain and associated communication and action; enable efficiency and cost control; maximize efficiency, reach and scalability; and achieve satisfactory ongoing performance. Authors were also asked to provide perspectives on considerations of feasibility, degree of impact, and likely cost.

A. Producer-Funded Strategies

EPR Overview

The OECD defines extended producer responsibility (EPR) as an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of the product's life cycle. An EPR policy is characterized by: (1) the shifting of responsibility (physically and/or economically; fully or partially) upstream toward the producer and away from municipalities; and (2) the provision of incentives to producers to take into account environmental considerations when designing their products. While other policy instruments tend to target a single point in the chain, EPR seeks to integrate signals related to the environmental characteristics of products and production processes throughout the product chain. [3]

EPR is sometimes referred to as "product stewardship;" however they can be differentiated in that EPR describes policy and product stewardship describes industry programs. Both EPR and product stewardship are used to address full life-cycle impacts of products, but practical emphasis has tended to focus on management of manufactured discards.

Additional items to note regarding each of the three EPR financing systems described below:

- *"Recycling"* (used repeatedly in the assessment criteria) means more than collection. It means processing collected material and using it to make new products, which are then purchased and used again. Financing systems that only address collection, or that incentivize quantities collected without regard for whether the material is used to make new products or packaging, are unlikely to improve "real" recycling.

- Attaining the highest impact within an EPR strategy hinges on the level of the performance standard set by government (reflected in the level of cost borne by the brand-owner and strength of that cost signal). A further factor is whether the brand-owner complies by providing its own environmental management (take-back and recycling system) or participates with other brand-owners through a consortium.

- Policies will need to include firm government oversight for ensuring accountability of brand-owners to achieve specified performance targets for the products and packaging that they specifically introduce into the market.

[3] For the purposes of this exercise the Financing Strategies work group adopted a working understanding of the OECD definition as focusing on end of life to send design signals.

Cost Internalization

An EPR system with **cost internalization** means that end-of-life environmental management costs are not charged to consumers in the form of a visible "fee." Instead these costs are absorbed by the brand-owner, or passed onto consumers invisibly by being incorporated into the overall price of products and associated packaging.

As with all EPR financing approaches, the producer's environmental care costs can be assessed in various ways. They can be charged on a *per-unit* or a *per-ton* basis. The costs can be assessed on the units or tons *introduced into the market*, or the units or tons *recovered through the program.* And, in the case of packaging, costs can be assessed on the basis of the *material type* (paper, aluminum, steel, HDPE, PET, aseptics, etc.).

Examples of cost-internalization programs include:

- *Post-consumer Pharmaceutical Stewardship Association in British Columbia* (no fee for take back to pharmacies)
- *Call2Recycle in British Columbia* (only free battery and cell phone collection programs in North America, covering all household batteries including alkalines).
- *Fost Plus in Belgium.* http://www.proeurope-congress.com/upload/William_Vermeir__sem.pdf
- ARA in Austria. http://www.proeurope-congress.com/upload/Christophe_Scharff.pdf
- *Voluntary e-waste programs.* Many electronics manufacturers have set up voluntary take back programs in states that do not have an EPR law for electronics. The programs vary, but often they require the consumer to either mail the item back to the manufacturer or drop it off with a specific recycler or retailer that the manufacturer has an agreement with. A list of these programs is available at http://www.electronicstakeback.com/how-to-recycle-electronics/manufacturer-takeback-programs
- *Estee Lauder's cosmetics packaging take-back program.*
- *Mandatory e-waste programs.* Generally the approach in place in the take back programs in the 23 states with producer responsibility e-waste laws (California has a government-managed, Advanced Recycling Fee). This link has information and links to all 24 of the state e-waste programs: http://www.electronicstakeback.com/promote-good-laws/state-legislation/.

1) <u>Financial sustainability</u>

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

Collection costs are covered as long as the stewarded products and associated packaging are sold.

Potential to make a significant contribution to a long-term solution

This strategy does contribute to a long-term solution, however, issues associated with "free riders" must be addressed. Experience in the EU and Canada shows that there are still issues in the marketplace of packaging with no clear owners, thus shifting costs to identified producers.

Potential to avoid escheats /assure that funds are used for the intended purpose

The strategy avoids government escheats because government is not involved in the financial operation of programs.

2) <u>Value chain, communication and action</u>

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

Cost internalization provides feedback on product design because producers control costs and operational aspects of the program. For example, costly-to-recycle and disposable packaging will have immediate feedback to packaging designers if producers see high costs of collecting and recycling or disposing of it.

The strength of these feedback signals is largely dependent on the level of cost incurred for environmental management. If costs are spread thinly across a large pool of participants and are not specific to materials and environmental impact – or if the environmental management system is not held to high performance standards – the cost signal will be diluted and unlikely to influence behavior.

Potential for effective consumer incentivization (through transparent cost signals or other means)

PERSPECTIVE 1: Cost internalization does not incentivize consumers; it hides the cost of EPR from the consumer. Consumers make no connection between the cost of the product and its relative sustainability,[8] and less connection between the cost and its partial funding of the product end-of-life disposal.[9]

PERSPECTIVE 2: While cost internalization may hide environmental care costs from the consumer, most other components that make up a product's cost are hidden. In so doing we forgo many other opportunities to incentivize and educate, such as elucidating a bloated marketing budget of Company A over B; informing the buyer of the exorbitant

[8] Andrew Binkle, "Designing Efficient Waste Systems: A Comparative Assessment of Extended Producer Responsibility Policy Instrument", Presented at the Wealth Without Waste Conference, February 2009, Section 5.3.2.3. https://www.rco.on.ca/uploads/File/wealthwithoutwaste/Binkley_EPR_ppr.pdf

[9] Andrew Green and Michael Trebilcock, "The Eco-Fee Imbroglio: Lessons from Ontario's Troubled Experiment in Charging for Waste Management", CD Howe Institute Commentary, No. 316, December 2010, pages 15-16. http://www.cdhowe.org/pdf/Commentary_316.pdf

retirement package in Company C versus Company D; or spotlighting the great deal on raw materials Company E got over Company F. In other words, many argue, environmental cost should no more be called out in the product price than all the other costs of doing business that companies must minimize so as to maximize profit. Communication with consumers is important for the success of cost-internalized EPR programs. Producers should, at the outset of new EPR programs and for some time afterward, communicate to consumers that the advertised and posted shelf price includes a cost for the proper recycling and end-of-life management of the product.[10]

Potential to influence consumer behavior in needed ways

The potential is mixed. On the one hand, a complete "cost internalized" system could potentially lead to high recycled-material content in packaging, and for greater opportunities to educate consumers about the benefits of such products. On the other hand, under the same scenario there is less need to influence consumers to specifically buy recycled-content packaging, as it becomes the norm, not the exception.

Potential to improve recycling rates in the U.S.

Cost internalization is not a strategy *per se* that drives recycling rates. It may be part of a larger system that contributes to increased recycling rates. Cost internalization may be an incentive to reduce costs by increasing recyclability of packaging and thus lead to increased recycling rates. However, several other factors dictate packaging composition, including food safety, package safety, durability, and shelf life.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

Price signals that must be borne can potentially lead to further packaging design changes. Of course, such changes are mitigated by consumer demand, product safety, etc.

Potential to foster innovation in processing technology

When producers are responsible for the cost of the recycling of their packaging, there will be strong motivation to ensure that processing technologies are efficient and effective. Producers will have strong direct incentive to invest in innovation, including processing technology, to ensure that their packaging can be recycled. EPR with cost internalization could also open the door to competition between brand-owners, allowing companies to compete with each other by reducing their environmental management costs. One key to innovation is the opportunity for competitive advantage through innovation.

[10] Duncan Bury, "Policy Forum: *Should Extended Producer Responsibility Programs Use Eco-Fee-Included Pricing?* " Canadian Tax Journal, Vol 58, No. 4, 2010, p. 944.

Potential to establish a level playing field between recyclables and virgin materials / Encourage markets for recycled materials

Cost-internalization has the potential to assist in leveling the playing field, but in and of itself, is unlikely to completely level the playing field. For example, the strategy can be designed to assist by providing incentives for producers to use or increase recycled content in order to create a market for their packaging. Furthermore, unlike other strategies, cost-internalization is not inconsistent with complementary policies that level the playing field between recycled and virgin materials.

When cost-internalization is part of a robust system that increases recycling rates, increased collection allows for greater recycled material supply. Studies show that once a stable supply is established, the market can then respond with innovative ideas for use of the supply, thus encouraging a market.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

This strategy allows for such recognition and allocation, and this is an element of the policy design, as well as the inherent incentives to improve upstream design and downstream effectiveness and efficiencies, including market development.

3) Efficiency and cost control

Potential to operate efficiently and reduce total system costs in the long run

PERSPECTIVE 1: Cost internalization has high potential to operate efficiently and reduce total system costs because producers are in the driver's seat. (Economic drivers must be coupled with producers being fully accountable for achieving the prescribed environmental outcomes.) By internalizing currently externalized environmental care costs of collection for recycling, cost-internalized EPR removes an important market distortion.[11] Evidence suggests that diversified systems for different packaging streams -- such as curbside, deposit-refund, return to retail -- can reduce system costs by targeting specific consumer demographics and allowing optimization of different collection modalities.[12]

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[11] Andrew Green and Michael Trebilcock, "The Eco-Fee Imbroglio: Lessons from Ontario's Troubled Experiment in Charging for Waste Management", CD Howe Institute Commentary, No. 316, December 2010. http://www.cdhowe.org/pdf/Commentary_316.pdf

[12] Hogg, Fletcher, Elliott and von Eye, "Have We Got the Bottle? Implementing a Deposit Refund Scheme in the UK", http://www.cpre.org.uk/filegrab/Havewegotthebottle.pdf?ref=4438 (September 2010)
The report states that the argument that deposit-refund systems are duplicative and increase system costs is "pure speculation based on the unlikely scenario in which there is no effect on the logistics of the pre-existing system." In fact, the findings suggest that if recovery of beverage containers through a deposit return program is very high, then there is limited need to include bottles and cans in a curbside program and the curbside system can concentrate on optimizing the logistics of collecting the remaining materials such as newspaper, phone books, paper, cardboard, and other household-generated container packaging.

PERSPECTIVE 2: Cost internalization could potentially increase total system costs by placing artificial inflationary pressure on product costs, and thus distorting the market. Additionally, experience from the European Union shows that system costs are not reduced because the same infrastructure is needed to continue providing consistent levels of service.[13]

Potential to improve the efficiency of the recycling system

While cost internalization does not directly impact recycling system efficiency, it could be part of an effective system that drives overall recycling rates, thus improving system efficiency with greater throughput.

Potential for cost control

Producers will be highly motivated to ensure services are not only effective at achieving the required standards, but are also delivered at good value. This can help drive cost control at other points in the value chain, including collection and processing costs as those sectors compete to get the business of the producers.

4) <u>Consistency, reach and scalability</u>

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

Cost internalization can be implemented state-by-state or nationally, although the latter is unlikely.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

This strategy has promising potential to accommodate the broad range of consumer settings. With the free-market emphasis of cost-internalization systems, the creativity and diversity of the market is brought to bear. There will likely be many service options created and tested in the marketplace as producers attempt to achieve efficiencies and cost-effectiveness.

[13] Jane Bickerstaff, INCPEN, in response to a question raised after her presentation to the group, said "Municipalities should in theory be able to reduce charges to the public if they either have less waste to collect or are subsidized by the public sector for a portion of waste. *In practice though the costs of waste collection are hardly affected because the vehicles and labor have to be provided even if one dustbin a road is completely empty*. Disposal to landfill costs are affected a little but packaging is a small percent (no more than 5%) of waste sent to landfill and, thanks to companies' – like yours – lightweighting programmes, the amount of packaging per pack is being continuously reduced." (Emphasis added.)

5) Ongoing performance

Potential for measurable performance data

An EPR system, regardless of cost internalization, can provide measurable performance data because it needs to be reported and assessed in order to demonstrate compliance. While this information collection adds additional costs to the producer that must be internalized, it provides information about a product's life cycle allowing producers to make design and system adjustments.

Potential to produce high-quality commodities

EPR systems have drivers that can incent production of high-quality commodities. The environmental performance of the EPR program is largely determined by clear standards set and enforced by government. The concept of cost internalization, without other related policy factors, does not automatically yield high-quality commodities. However, when set up properly, the market will help drive the demand for high-quality commodities. When producers are in the driver's seat to establish take-back programs, a natural gradation of service-levels will emerge that rewards higher-quality materials.

Commodity quality is also determined by the producer to meet market demand. In addition, consumer demand for different product packaging can fuel market innovations.

Potential for sufficient flexibility to allow for improvement of recycling system technology

Due to factors noted above, there are economic and other drivers to allow and encourage the improvement of recycling system technologies. EPR systems based on individual rather than collective producer responsibility (sometimes called Individual Producer Responsibility) may have additional drivers for brand-owners to compete by investing in superior recycling system technologies. Flexibility is central to cost-internalization and successful EPR.

6) Overarching considerations

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

EPR is relatively new to the U.S. both generally and as a financing system for packaging. As such, concerted opposition can be expected from a variety of parties, while others will provide concerted support.

Political feasibility

The political feasibility of cost-internalization as a financing strategy remains to be seen. In the U.S., EPR legislation is being adopted for a variety of hazardous and other discrete products, while proposals for its application to packaging have not yet been adopted but continue to emerge. EPR for packaging faces the challenge of being perceived as a tax increase. However, it is less likely that producer-managed environmental care costs would be perceived as a tax under cost internalization than they would with visible fees.

Avoidance of undue complexity for producers, retailers and consumers in implementation

The strategy avoids any complexities for retailers and consumers, but does create complexities that are currently non-existent for packaging producers in the U.S.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

The strategy has the potential to highly impact current challenges, including lack of collection infrastructure, ineffective or inefficient collection infrastructure, lack of options for diverse generators, lack of funds for MRF improvements, lack of access to major media messaging, etc.

C) Characterization of likely cost in relative, qualitative or quantitative terms

As long as there are clear performance standards that are set and enforced by government on all obligated brand-owners, these questions are best addressed by brand owners themselves.

Partial Cost Internalization

Partial cost internalization differs from full cost-internalization as described above in that a *portion* of the environmental care costs are paid by the brand-owner or retailer, or passed onto consumers by being incorporated into the overall price of products and associated packaging. The balance of the costs is not internalized and remains with the local government or its ratepayers/taxpayers.

Two examples include the Ontario Blue Box System, *Stewardship Ontario*, http://www.calpsc.org/products/events/docs/2010-11-17_Derek-Stephenson.pdf and Maine E-Waste. Both are mandatory programs.

The description below elucidates ways in which partial cost internalization varies from full cost internalization along the key elements of the assessment.

1) Financial sustainability
Under a partial cost internalization system financial sustainability is less clear than under full cost internalization. It would depend on how and by whom the remaining system costs are funded. If local government remains as the other funder, the same limitations of the current system apply but to a lesser degree as the government obligation is lower. Escheats can be avoided if the government is not holding the funds for the other portion of the program. These funds can be held by other entities on behalf of the government if the government is involved.

2) Value chain communication and action
A partial cost internalization system would have the same type of impacts on the value chain as full cost internalization but to a lesser degree due to the fact that the producers are not paying all of the costs. One area where there are significant differences is in the clear roles and responsibilities. Having two or more entities involved in funding a waste management system necessarily complicates the ability to clearly define roles and responsibilities.

3) Efficiency and cost control
Under a partial cost internalization system, efficiency and cost control potential is not as great. Since there will be at least two organizations involved in sharing total system costs, there will be additional coordination costs and likely more redundancies introduced into the system than currently exist.

4) Consistency, reach and scalability
With partial cost internalization, the full breadth of service can be achieved but the ability to implement consistent programs may be limited. There are a multitude of existing funding systems and if only a portion of those costs would be transferred, it is reasonable to assume that the remaining system costs would continue to be funded as they are now.

5) Ongoing performance

It is anticipated that ongoing performance under partial cost internalization would be largely the same as with full cost-internalization, with the exception of the degree of flexibility. With two or more entities involved in managing the program, the flexibility to respond to improvements in recycling system technology will likely be reduced.

Overarching considerations

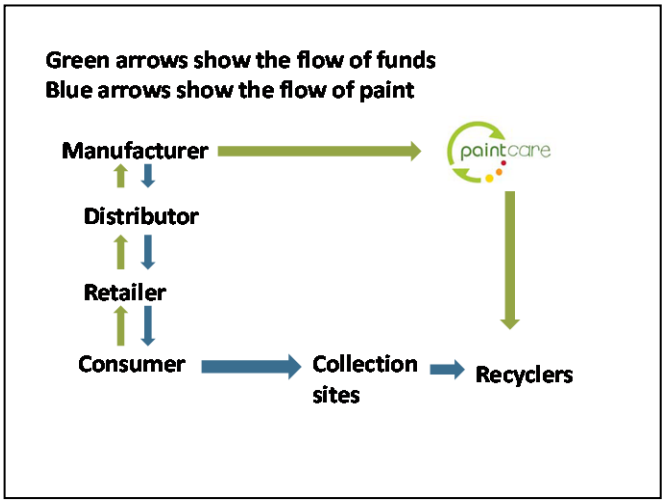
Partial cost internalization will have the same political challenges as full cost internalization, will generate additional complexities due to the need to coordinate with at least one additional organization and is likely to have a lesser impact on the problem because only a portion of the system costs would be assumed by producers. The existing financial limitations would remain for the balance of the system costs.

EPR Eco-Fees

Eco-fees are charges imposed to capture the end-of-life management costs associated with a product or material. All manufacturers pay the same fee for the same products. Eco-fees are generally set by industry but may be specified in legislation such as in Oregon's paint law.

Eco-fees are paid on a per-unit basis and frequently managed by a private third party organization (typically, an industry-funded non-profit) that handles collection and recycling responsibilities for a group of brand owners. The eco-fee may be either added into the price of the product (invisible to the consumer) or passed down the value chain as a visible fee to the consumer. Systems where the eco-fee is visible to the consumer have some similarities to an advanced disposal fee and the characteristics described in that paper; however eco-fees are managed by industry rather than by government. Systems that do not visibly pass the eco-fee down the value chain have some characteristics of cost internalization systems; however the funds and responsibilities for managing the program are entrusted to third party organizations rather than undertaken by individual brand owners.

In some cases, eco-fees may not cover the entire costs associated with collection and processing of the product or material. In those cases, government may provide additional funding.



One example of an eco-fee system is Oregon's Paint Stewardship law. An Eco-fee is paid by the manufacturer to Paint Care, a non-profit entity, for every container of paint, stain and varnish sold in Oregon. This cost is passed down the distribution chain and ultimately paid by the consumer. Paint Care sets up agreements with local governments, retailers, and others to be collection points. Paint Care contracts with transporters and processors to pick up and manage the material. The amount of the Eco-fee is in the manufacturer's plan and is subject to approval by the Department. The following table shows the Eco-fees that were approved in Oregon.

Oregon Eco fee -	
1/2 pint or less	$0.00
>1/2 pint to 1quart	$0.35
> 1 quart to 1 gallon	$0.75
>1 gallon to 5 gallon	$1.60

Other examples of eco-fee systems include:

- Encorp Pacific in British Columbia (beverage containers and electronics)

- Tire Stewardship BC
- BC Used Oil Management
- Electronics Stewardship Association of BC
- Paint Care in OR, CA and several Canadian provinces
- Carpet America Recovery Effort (CARE) in CA

1) <u>Financial sustainability</u>

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

Eco-fees have been successfully used for various products and packaging. The amount of funds generated is relative to the amount of the product/packaging being sold, therefore, as the amount available for recycling increases or decreases the funds generated changes accordingly. The fees can be adjusted if the funds being generated are insufficient or excessive, except when the fee amounts are established by government legislation.

Potential to make a significant contribution to a long-term solution

As mentioned above, Eco-fees have been successfully used for various products and packaging.

Potential to avoid escheats /assure that funds are used for the intended purpose

If the fee is set at an appropriate level there should not be an accumulation of funds. The program can be set up so that the third party organization is audited and accountable.

2) <u>Value chain, communication and action</u>

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

Yes, although the feedback is a more limited than other forms of EPR. Producers will want the fees to be as low as possible, which will give them an incentive to use packaging with lower lifecycle costs. However, because the fee is set regardless of brand, there is less of an incentive for individual producers to make changes.

Potential for effective consumer incentivization (through transparent cost signals or other means)

The fee may be visible to the consumer or incorporated into the cost of the product. Fees could be set based on environmental attributes of specific materials and therefore, as long as various options were available, consumers could be incented to select packaging with higher environmental performance. However since the fee (by material) would be the

same regardless of brand, consumers would not have an incentive to select a brand whose packaging was more environmentally friendly by design. If eco-fees were set at the same rate for all materials, little if any incentive would occur.

Potential to influence consumer behavior in needed ways

If the consumer understands that they paid for recycling when they bought the product, they may be more likely to recycle the packaging and if the fees are based on environmental performance of the material, they would be incentivized to choose the packaging with the least environmental impact.

Potential to improve recycling rates in the U.S.

This strategy can help boost recycling rates, especially if the funds are used for education and infrastructure in addition to recycling. An advantage to this type of system is that it would be highly standardized so there would be less confusion by the public as to what can or can't be recycled, and that clarity should benefit recycling rates.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

If fees are set based on environmental attributes of each material, then it would incent innovations towards packaging with lower environmental impacts.

Potential to foster innovation in processing technology

Because the third party organization would be contracting for the processing, they would look for the most efficient way to process large quantities of materials.

Potential to establish a level playing field between recyclables and virgin materials / Encourage markets for recycled materials

Because producers will want to keep the fees low and are managing the system, they will have an incentive to use recycled content in their products to provide a market for the material collected.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

An Eco-fee approach does envision different roles and responsibilities for manufacturers, retailers, and government agencies; however, they would need to be clearly defined either in an MOU or in legislation.

3) Efficiency and cost control

Potential to operate efficiently and reduce total system costs in the long run

Because the manufacturers have a vested interest in keeping the fees low, and due to their significant role in controlling the system, they have an interest in keeping it as efficient as possible.

Potential to improve the efficiency of the recycling system

As mentioned above, manufacturers have an incentive to keep the system as efficient as possible.

Potential for cost control

As explained above there is some potential for cost control. However, since there is no competition (the fee is the same regardless of brand) there is not as much of an incentive to reduce costs as there would be in an Individual Producer Responsibility (IPR) system.

4) Consistency, reach and scalability

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

Fees would need to be set on a statewide or national basis to achieve consistency. If one third-party organization served all of the states with legislation, or the whole United States, a high degree of consistency would be achieved.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

Since fees are based on sales, all consumers would be included no matter where they reside.

5) Ongoing performance

Potential for measurable performance data

Performance data would be relatively easy to track since the funds collected would be based on the amount sold, and presumably funds paid to the collectors, transporters, and processors would be based on volume.

Potential to produce high-quality commodities

If fees are easily adjustable, EPR systems have drivers that can incent production of high-quality commodities which will have greater value and thereby reduce costs to producers. However, quality of the commodities will also be influenced by other factors, such as the environmental performance required and enforced by government, and the quality of the collection and processing systems utilized.

Potential for sufficient flexibility to allow for improvement of recycling system technology

If the fees can be adjusted as conditions change and are not established in legislation by the government, they will be very flexible.

6) <u>Overarching considerations</u>

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

Support for this strategy is closely tied to how it is implemented. Consumers will need to be educated on the system. If the fee is visible to the consumer and is placed on a wide variety of packaging, there is likely to be objection by a wide variety of parties. Opposition or support from retailers would depend on how the system is implemented, especially if visible fees are passed all the way through the value chain. If the retailers are required to add various visible fees to different products they would object.

Political feasibility

Eco-fees are sometimes perceived as a tax which can make them difficult to legislate. If the eco-fees are applied visibly at the point of retail, political feasibility could become a significant challenge.

Avoidance of undue complexity for producers, retailers and consumers in implementation

Complexity depends on the specifics of the system. A system where the fees are paid by manufacturers to the third party organization and the cost is incorporated into the price when the product is sold to distributors would be very simple. However if the fees are visible down the chain to the consumer it would be much more complex. Presumably there would be different fees for different types and sizes of packaging which would also add to the complexity.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

Eco-fees could have a high impact and be a significant improvement over the status quo. They would provide the funds needed to overcome the present obstacles and could provide consistent education to consumers.

C) Characterization of likely cost in relative, qualitative or quantitative terms

The cost of the system will need to be addressed by the brand owners so that the fees are set at a level that will fully fund the system. Existing programs for packaging in Canada and Europe could provide additional information on costs.

B. Consumer-Funded Strategies

Product-Based Advance Disposal Fees

Advance disposal fees (ADFs) are fees added as a separate line item to the price of the product at point of sale. These fees are notably visible so the consumer knows that a designated cost is going towards end-of-life recovery. They are funded by consumers and managed either by retailers or the government. They are distinguished from eco-fees in three ways. Eco-fees are often managed by a non-profit organization funded by the producers of the materials, eco-fees can include factors other than end of life disposal costs, and eco-fees can be invisible to the consumer.

This assessment pertains specifically to the application of ADFs to consumer packaging and does not assess the attributes of ADFs to address non-packaging products, such as those that are hazardous or hard to handle.

Research done in October 2010 by Skumatz Economic Research Associates, Inc., for StopWaste.Org on ADFs found a few examples in the U.S. and other international examples for non-packaging products or select types of packaging. Examples include traditional ADFs, such as San Francisco's Litter Abatement Fee, California's Tire fee and E-waste law (passed in 2004), and fees on single-use bags in Washington, D.C., Ireland, and Italy. No current examples are known that cover a wide range of packaging products and materials, though Florida passed (and then allowed to sunset) an advance disposal fee on packaging.

Florida's ADF initially took effect October 1, 1992, as a deposit of a penny per container on all containers with recycling rates less than 50%. In 1993 the program was modified to assess the penny fee on those cans, bottles, jars, and beverage containers from 5 ounces to one gallon which had not achieved recycling rates greater than 50% in Florida. Exemptions were provided to companies that met recycling and recycled content goals. The ADF was structured to phase out for containers that achieved the targeted recycling rates, and to increase to $.02 for those that did not achieve recycling goals after a year. The program was estimated to generate $65 million for the state, but ultimately did little to solve litter/waste problems, as 99% of all beer and soft drink containers were exempt from the ADF. The ADF was allowed to sunset in 1995.

ADFs are not necessarily recycling fees: in fact recycling doesn't show up in the name of the strategy. ADFs can be used to finance the proper disposal, rather than recycling, of some hazardous materials. In California, the fees charged at the point of sale for covered electronic devices are called Advanced Recovery Fees or ARFs.

Newer versions of container "deposit" legislation do not refund deposits at all but the "advance fees" are used to expand or educate consumers about recycling options already available to them.

1) Financial sustainability

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

Advance Disposal Fees (ADFs) can provide secure and stable financial resources for the products covered by the fee, if properly managed and if the funds collected are used solely for the intended purpose. However, ADFs deposited in government accounts may be at risk to be appropriated for other purposes. ADFs on specific packaging would likely not generate sufficient resources to fund recycling infrastructure for other, non-covered products or packaging.

ADFs at the retail level, separately charged to consumers for a broad range of packaging, are unknown. Fees are most often applied to specific product categories rather than broad categories like packaging, aside from a limited number of specific cases such as single-use shopping bags.

Potential to make a significant contribution to a long-term solution

The potential of packaging ADF to contribute to a long-term solution is dependent on several factors. For instance, if fees are practical, garner the political will to apply at the point of retail to be paid by consumers, and are set at a sufficient level to cover the costs of: i) managing the materials from collection to recycling; ii) creating collection and recycling infrastructure where needed; and, iii) administering the program, then this type of financing could serve as a financial base for a recycling system if fees are set for all materials collected in collection programs.

Potential to avoid the misappropriation of funds / ensure that funds are used for the intended purpose

State and local government managed funds are vulnerable to having funds diverted for other purposes. There are several historical examples of this occurring.

2) Value chain communication and action

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

While ADFs provide feedback to various points in the value chain; the level of feedback varies based on position in the chain. The most direct feedback is communicated to consumers, who pay the fees at retail and might respond to the price signals in their purchasing decisions.

Looking upstream, brand owners may be motivated to make packaging changes in order to avoid the ADF since it may impact sales, but in the event this is not possible, there is

no additional incentive. This upstream feedback is somewhat indirect and further limited, given that ADFs specifically cover the costs for recycling or disposal (rather than full life-cycle costs) and are typically averaged across diverse materials. Assessing fees across a broad category of materials reduces direct feedback to manufacturers, so there is limited opportunity to compete within specific segments.

Fees must be set high enough to affect consumer behavior in order to achieve the desired changes. The level of fee necessary will vary by product category and demand elasticity.

Fees also provide immediate feedback to producers on consumer willingness to make financial trade-offs for considerations like single-serve and other convenience packaging.

Potential for effective consumer incentivization (through transparent cost signals or other means)

ADFs for packaging can provide transparent cost signals to consumers, but also can result in consumer resistance due to the perception of increased costs or "taxes" on groceries and other products.

A potential benefit of fees is that they convey the message to the consumer that some products/packaging have higher end-of-life handling costs than others. Generally speaking, the ability of the fees to influence behavior is completely dependent on the criteria used to set the fees and whether the fees are assessed on each packaging type or on a broad range of materials. If cost of handling the materials is the sole criterion, the consumer impact would be marginal at best.

Potential to influence consumer behavior in needed ways

ADFs' influence on consumer behavior is almost completely dependent on the costs to be included in the fees and consumer response to the fees. Consumers would likely choose products with the lower fee, or no fee at all, or they may reduce use of the product, assuming they are willing to accept a fee-based system at all and assuming high demand elasticity. ADFs may incent consumers at point of purchase, but not necessarily extend to incenting behavior to recycle at end of life.

Potential to improve recycling rates in the U.S.

Improvement in recycling rates depends largely on the extent of recycling infrastructure that is in place to make it convenient for consumers to recycle their packaging rather than dispose of it. Fees can help cover some or all of the recycling and infrastructure costs for covered products but charging a fee cannot guarantee that materials will be recycled.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

ADFs are typically based on end of life costs of the existing system and types of packaging used so there is little connection to packaging design. If the fees are based on

factors other than end of life costs, (lifecycle costs, recyclability, etc), there is potential for the fees to impact packaging design. However, the differences in recycling programs across the country and the number of stakeholders involved would make this a difficult strategy to implement successfully, and hence it would be unlikely to incentivize packaging innovation.

Potential to foster innovation in processing technology

Assuming fees are based on the cost of disposal/recycling, changes in processing technology may impact the costs of disposal/recycling and therefore fees could be modified to reflect the change in technology.

Potential to establish a level playing field between recyclables and virgin materials / encourage markets for recycled materials

The only way ADFs would contribute to leveling the playing field would be if the value of the virgin material tax credits is somehow offset in the fee setting structure *or* if recycled content packaging receives a credit on the fees. These scenarios have not been part of any fee structure to date.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

ADFs do not allocate roles across the entire value chain as the manufacturers and brand owners typically do not have a role in the payment of the ADF. Retailers collect the fee on product/packaging sales, consumers pay the fee, the government collects the money and finances the program. The parties that have the greatest role in the production of the packaging – manufacturers and brand owners, have only an indirect role – as their product sales would be impacted by the fees.

3) Efficiency and cost control

Potential to operate efficiently and reduce total system costs in the long run

Under an ADF scheme, retailers are obligated with a new task of collecting and transferring the fees to the appropriate agency that oversees the program and manages the finances. Both of these would be new functions and would increase costs to the obligated parties.

Potential to improve the efficiency of the recycling system

The strategy has little influence on recycling efficiencies. Fees would likely be based on current system costs rather than an optimized system. Current efficiencies will only be improved if fees are set to cover the expansion of recycling infrastructure into needed areas *and* if there is a standard for recycling efficiency that can be used as a benchmark.

The strategy adds work to the existing actors (government and consumers) and brings a new actor (retailers) into the equation.

Potential for cost control

There is little incentive for cost control in an ADF system, other than that provided by the public's response to the fees. Fees can be set to cover whatever costs are incurred, though they must be reasonable and justified in order to gain public acceptance. Theoretically, fees have the potential to drive packaging choice and design but in instances where lowest cost packaging is being used, there would be no other cost controls available under an ADF structure.

4) Consistency, reach and scalability

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

Fees could be set at the state level which would be applicable to all cities and counties within the state. The fees would not accurately reflect the costs to dispose of or recycle that material statewide as costs would vary due to differences in collection costs and recycling infrastructure, so they would have to be set to reflect average costs. While this is possible, implementing such schemes in a consistent manner through multiple state laws or national legislation is unlikely.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

Fees would be collected at the retail level so they could be applied to all consumers. However, it is not clear how they would help provide collection for recycling at all locations.

5) Ongoing performance

Potential for measurable performance data

ADFs can be tracked by requiring reporting from the businesses responsible for collecting the fees but this will only show the level of sales activity for the product. Data on recycling rates or other desired outcomes would not be measured via ADFs.

Potential to produce high-quality commodities

In order to incentivize high-quality commodities, ADFs would have to take into account several factors, including lifecycle costs of the materials in the commodities and the associated packaging, costs to handle and recycle the materials, and recycling markets and infrastructure in place in any given area.

Potential for sufficient flexibility to allow for improvement of recycling system technology

Historically ADFs have not been assessed to improve recycling system technology or efficiency. Theoretically it would be possible if fees were adjusted to reflect both the level of recycling technology in a given area and the costs to change the system, *and* if the funds were not diverted for other purposes. However, such a scenario is unlikely.

6. Overarching considerations

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

ADFs are likely to be opposed by a variety of groups, including consumers, retailers, consumer/tax groups and politicians. Industry and other stakeholder groups at various times have portrayed ADFs as a "tax" on products subject to the fee, and as a means for government to collect taxes for uses other than those stated.

Political feasibility

Based on the potential diversity of opposition to the strategy and the complexity of attempting to collect fees across such a broad category as packaging, implementation may not be feasible. ADFs may be more appropriately placed on specific products, such as tires or hazardous materials, than on widely used packaging materials like corrugated cardboard.

Avoidance of undue complexity for producers, retailers and consumers in implementation

ADFs will add complexity for retailers, governments and consumers. Governments will need to establish bureaucracies for collecting and managing funds, as well as implementing programs. Retailers will have to change their accounting and point of sale systems to track and transmit the fees, as well as train checker staff (with low experience and high turnover) to respond to consumer inquiries. Consumers will have to learn and understand the new system.

B) Degree of impact (high, medium, or low) on the problem on present challenges with financing of recycling of municipal solid waste

The impact would be low since fees would only be applicable to a small portion of the overall municipal waste stream. It would be an improvement over the status quo in that a portion of the waste steam would receive funding from the fees.

C) Characterization of likely cost in relative, qualitative or quantitative terms.

According to a recent report by Skumatz Economic Research Associates, Inc. prepared for StopWaste.Org, the cost of implementing an ADF system in Alameda County (population 1.5 million) for packaging materials would be between $500,000 and $1 million.[14]

[14] Lisa Skumatz and Heidi Sanborn. "Advance Disposal Fee (ADF) Options Research", Alameda County, StopWaste.org, October,2010.
http://www.stopwaste.org/docs/adf_draft_report_oct_26.pdf

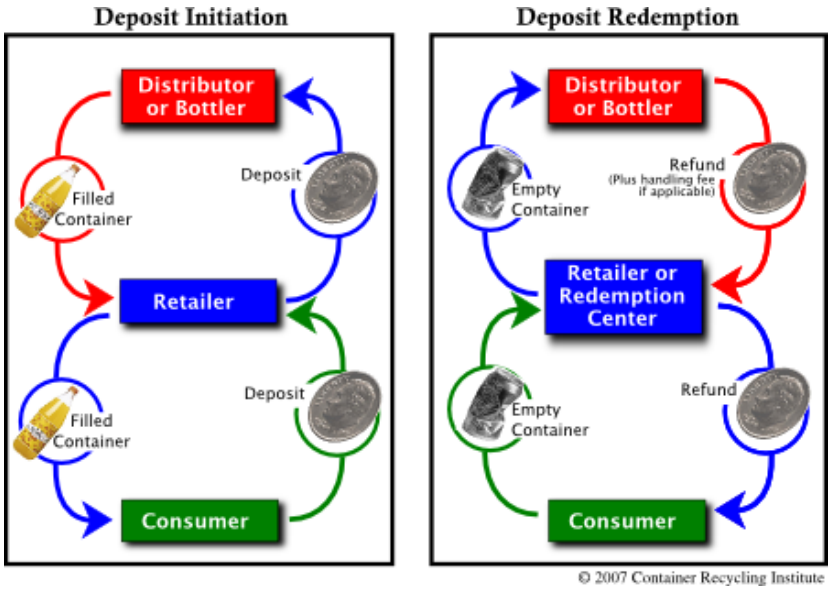
Deposits and Unclaimed Deposits

Container deposit laws (also known as Bottle Bills) require a minimum refundable deposit on containers (usually beer, soft drink and other beverage containers) in order to ensure a high rate of recycling or reuse. The deposit-refund system was originally created by the beverage industry as a means of guaranteeing the return of their glass bottles to be washed, refilled and resold. Litter reduction has also been a historical driver for some deposit laws.

In most deposit jurisdictions, when a retailer buys beverages from a distributor, a deposit is paid to the distributor for each can or bottle purchased. The consumer pays the deposit to the retailer when buying the beverage. When the consumer returns the empty beverage container to the retail store, to a redemption center, or to a reverse vending machine, the deposit is refunded. The retailer recoups the deposit from the distributor, plus an additional handling fee in most U.S. states. The handling fee, which ranges from 1-4 cents, helps cover the cost of handling the containers.

Today, ten states[15] and eleven Canadian provinces have a deposit law requiring refundable deposits on certain beverage containers. Although bottle bills meet with opposition from many members of the beverage and grocery industry, several states and provinces have expanded their laws to cover beverages such as juice and sports drinks, teas and bottled water—beverages that were less widely sold when most bottle bills were passed.

The costs to distributors and bottlers can be partially offset by the sale of scrap cans and bottles and by short-term investments made on the deposits that are collected from retailers.



[15] The states are Oregon, Vermont, New York, Michigan, Connecticut, Iowa, Massachusetts, Maine, California, and Hawaii. Delaware's law was repealed in 2011.

What are "unclaimed deposits"?

In ten U.S. States, beverage distributors and retailers are required by law to collect small deposits (usually a nickel) on certain packaged beverages—typically carbonated soft drinks and beer.[16] When the consumer returns these beverage containers to a retailer or redemption center, the deposits are returned. When a consumer chooses not to return a deposit container, the deposit money is considered "unredeemed." Other terms are "abandoned" and "unclaimed."

The exact amount of unclaimed deposits is not known precisely in all states, but can reasonably be expected to amount to millions of dollars a year, based on examples where data is available (see below). In the states where the deposit is 5 cents, 15 to 33 percent of beverage containers sold are not returned for their refund value. Since all of the deposit states also have municipal recycling programs, some of the unredeemed containers are recycled either through curbside programs or drop-off sites. In addition, some of the redeemed containers come from outside the deposit state, so the exact share of deposit state containers that are redeemed for refund is not known.

Redemption rates vary widely depending on a variety of factors, but they are primarily a function of the deposit amount. A higher deposit results in a higher return rate and fewer unclaimed deposits. In Michigan, the only state with a dime deposit, only 3 percent of containers sold are not redeemed. In California, where the deposit ranges from 5 to 10 cents, approximately 20% of the containers were not redeemed in 2010.

Who keeps the unclaimed deposits?

All these unclaimed deposits remain the property of the distributors and bottlers in three states (Oregon, Vermont, and Iowa), while a portion of unclaimed deposits remains with distributors and bottlers in Maine and New York. Currently Connecticut, Massachusetts, and Michigan collect 100% of the unclaimed deposits, New York collects 80% of unclaimed deposits, and Maine collects a portion, although the mechanism for retaining these deposits varies. In California and Hawaii, the state collects the deposits from distributors when the beverages are sold to retailers. The bottler or distributor pays the deposit directly into a state-managed fund and collects the deposit from the retailer. The retailer then collects the deposit from the consumer. Any unclaimed deposits simply remain within this state-managed fund and are used to administer the deposit system.

In Michigan and Massachusetts, the courts have ruled that because these unclaimed deposits are "abandoned" by the public, they rightfully belong to the state, and they are used in some cases to fund environmental programs in those states. In Massachusetts, distributors and bottlers are required to turn over all unclaimed deposits to the state, and the revenue becomes part of the state's General Fund. The unclaimed deposits are said to "escheat" to the state. Michigan escheats 75% of unclaimed deposits, and redistributes

[16] Two states require deposits on carbonated beverages and beer only. Eight states (Oregon, Maine, California, Iowa, New York, Connecticut, Vermont, and Hawaii) require deposits on one or more other types of beverages in addition to beer and soft drinks.

the remaining 25% to retailers as a way to offset their handling costs. Distributors retain unclaimed deposits in three states – Oregon, Vermont, and Iowa. In 2008/09, abandoned deposits amounted to $33 million in Massachusetts, $12.5 million in Michigan, and New York's 80% share was over $120 million.[17] Figures are not yet available from Connecticut.

Beer distributors and soft drink bottlers argue that these unredeemed deposits should be utilized to help offset their costs of managing the container deposit return system. State-funded research in Vermont in 2007, for example, indicated that unclaimed deposits were more than offset by the distributors' costs of operating the redemption system and paying the handling fee; there was no "windfall." Others argue that the beverage industry is already keeping revenue from the sale of scrap container materials (aluminum, plastic and glass) as well as the "float" (deposits collected from retailers that can be invested for short-term returns), and that unclaimed deposits are tax-free, windfall profits for the bottler/distributor. They argue that unclaimed deposits, like other types of abandoned property, should belong to the state and be used for public benefit. Nearly every deposit state has attempted to escheat the unclaimed deposits as a source of revenue, in some cases to fund environmental programs.

The mechanism for collecting and refunding the deposits varies from state to state as described below:

	Strategy	**Description**	**Example**
a)	**Unclaimed deposits – voluntary, industry controlled**	Systems charge a deposit at the time of purchase to encourage the return of the product (commonly used with beverage containers). Unclaimed deposits are used by industry to finance the system.	- Beer Store in Canada – for 60 years; attains 97% recovery for standardized glass bottles for refilling. - US beer and soft drink deposits circa 1900 to 1970.
b)	**Unclaimed deposits – mandatory, industry controlled**	Distributors mandated to charge a deposit at the time of purchase to encourage the return of the product (commonly used with beverage containers). Unclaimed	Distributors are financially obligated to fund the operation of the redemption system and use the unclaimed deposits to defray expenses including mandated handling fees of up to 4¢ per container. - In Iowa, Oregon, and Vermont 100% of the unclaimed deposits are

[17] Sources: "Beverage Container Deposit and Redemption Statistics: For the Period October 1, 1999–September 30, 2000", March 2002, New York State Department of Environmental Conservation, Division of Solid and Hazardous Waste Reduction & Recycling, Bureau of Waste Reduction and Recycling; Massachusetts Department of Environmental Protection chart, "MA Bottle Bill Return Rate Information FY 1990-FY2002;" E-mail communication with Matt Flechter, Recycling and Composting Coordinator, Michigan Department of Environmental Quality, Jan. 29, 2003.

	Strategy	Description	Example
		deposits are used by industry to finance the system.	retained by the distributor. - In Maine only distributors that operate comingled collection programs are permitted to retain the unclaimed deposits - In New York distributors retain only 20% of unclaimed deposits.
c)	**Unclaimed deposits – mandatory, government escheat**	Unclaimed deposits (typically from beverage containers) are utilized by the state. The funds are used for various recycling or solid waste programs (or for unrelated purposes).	California, Connecticut, Hawaii, Massachusetts, and Michigan collect 100% of the unclaimed deposits, although the mechanism for retaining these deposits varies. - In California and Hawaii, the state collects the deposits from distributors when the beverages are sold to retailers. The bottler or distributor pays the deposit directly into a state-managed fund and collects the deposit from the retailer. The retailer then collects the deposit from the consumer. Any unclaimed deposits simply remain within this state-managed fund. - In the industry-managed programs of Connecticut, Mass., Michigan, and New York, government escheats some or all of the unclaimed deposits so funds are not available to underwrite program operation. - Connecticut and Massachusetts escheat 100% of unclaimed deposits - Michigan escheats 100% of unclaimed deposits and redistributes 25%of the total to retailers as a partial offset of redemption costs. - Maine permits distributors operating commingled collection programs to retain unclaimed deposits, but other distributors lose the unclaimed deposits to the state. - New York escheats 80% of unclaimed deposits.

	Strategy	Description	Example
d)	**Partial Refund**	Systems that refund a portion of the deposit paid by consumer.	New Brunswick, Newfoundland, Nova Scotia, & PEI impose a deposit that is double the available refund value ("half-back" programs). The provinces collect the unrefunded portion.

1) Financial sustainability

(Including the following considerations: Potential to provide reasonably secure, sufficient, stable and ongoing financial resources; Potential to make a significant contribution to a long-term solution; Potential to avoid escheats and assure that funds are used for the intended purpose)

In the U.S., all deposit programs for beverage containers are financed and managed by the beverage manufacturers except in California and Hawaii. A significant amount of the program financing comes from the sale of recycled materials, and the rest is funded by the manufacturers. In some cases unredeemed deposits are an additional source of financing, but it should be noted that unredeemed deposits approach zero as the recycling rate rises to near 100%. Deposits are not meant to be a funding source; they are an incentive to get consumers to return their containers, and when successful, realize little revenue from unclaimed deposits. Therefore it is somewhat unlikely that deposits will develop into a comprehensive financing solution for packaging. However, it may be feasible, and in fact desirable, to address shortcomings in existing container deposit systems, in which case deposits can be an effective solution for specific materials, such as beverage containers.

An issue some stakeholders have with deposits is that the funds collected are not always secure. If managed by industry there is no guarantee funds will be invested in the system, and if managed by government there is a high likelihood that funds will be utilized to offset state budget shortfalls or other purposes. Ensuring that funds are used for their intended purpose and not borrowed or taken for other needs, whether for public good or for profit, is essential, but again, unclaimed deposits are not the intended funding mechanism. Some stakeholders believe that industry-managed beverage container programs are a form of EPR. The intended funding mechanism is to have producers fund end-of-life management and build those costs into the price of the product. Also, a mechanism for adjusting deposits with inflation would help ensure the value of the deposits does not erode over time, which results in lower redemption rates and higher numbers of unclaimed deposits.

Ultimately, this approach may be perceived as unsustainable because it relies in some part on failure of the recycling system for funding. The better it works (the more bottles are recycled directly by consumers), the fewer funds are available through unclaimed deposits to support the system. Revenue is raised through failure of recycling. That said,

there will be uncollected deposits and these can and should be used to increase recycling, though they are not always used for that purpose in deposit states that take the unclaimed deposits.

2) Value chain, communication and action

(Including the following considerations: Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects; Potential for effective consumer incentivization (through transparent cost signals or other means); Potential to influence consumer behavior in needed ways; Potential to improve recycling rates in the U.S.; Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management); Potential to foster innovation in processing technology; Potential to establish a level playing field between recyclables and virgin materials / Encourage markets for recycled materials; Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain)

Deposit systems are closed-loop programs. With the exception of CA and HI, it is the responsibility of the beverage industry to take back their own containers for recycling, and they control the movement of materials and can choose to use them to make new bottles and cans or sell them to others.

Deposits have been demonstrated to incentivize consumers quite effectively; bottle bill states boast recycling rates for beverage containers between 67 and 95% (though these rates includes redemptions of containers from outside the deposit state). This strategy can undoubtedly improve container recycling rates in the US. Deposits have fostered innovation in processing technologies for individual container redemption (i.e., reverse vending machines), although the applicability of this technology to non-deposit jurisdictions or other types of containers has yet to be demonstrated. Deposits have a smaller influence on innovations in packaging design. Deposits encourage markets for recycled materials by virtue of the fact that they result in the collection of large volumes of clean materials, creating ample supply of raw materials for use in recycled-content products. For example, glass beverage container recycling is much improved with deposit return systems, reducing costs and raising marketable values throughout the system. The glass is clean and often separated by color for much better recovery. However, not all players in the value chain derive full benefit from deposit systems. Materials Recovery Facility operators experience a decrease in recoverable aluminum and PET containers (and associated revenues) from curbside programs, as these materials are captured through the deposit scheme.

3) Efficiency and cost control

(Including the following considerations: Potential to operate efficiently and reduce total system costs in the long run, Potential to improve the efficiency of the recycling system)

Although there are some claims that Bottle Bills create bloated public sector departments, in practice this does not seem to be the case. In Hawaii, 3 government employees administer the system. California has 240 government employees, which is proportional to the 28.5 employees that administer beverage container programs for Encorp in British Columbia, where the program is industry-run (given the population in BC and CA, there is one administrative employee for about every 150,000 persons in each respective jurisdiction). In other industry-run Bottle Bills, there are typically two or fewer government FTE positions to oversee the program, while administration is done by industry. Developing deposit legislation covering all product types would be unreasonably cumbersome and impractical, but if specific brand owners are required to achieve high rates of recovery for specific packaging types, they may choose to use deposits. This strategy's best role may be to maintain high levels of recovery for beverage containers since there are ancillary benefits of a clean stream of other recyclables (e.g., free from glass contamination) which reduce processing and other system costs, though this can increase costs to retailers and distributors. Some stakeholders view the redundancy of a deposit system existing alongside a curbside system to be a significant source of inefficiency and feel that having parallel systems does not make sense from an economic or environmental standpoint. Others point out that one-size-fits-all approaches seldom achieve optimal results. Products and packaging evolve and so do points of generation; a diversity of collection options are needed to ensure that as products and end-of-life aspects change, the collection system is flexible and able to accommodate the material.

Another potential concern centers around the tendency for bottle bills to pull aluminum cans out of the curbside recycling stream, thus negatively impacting revenues. Data available from Stewardship Ontario indicates that aluminum is the only material in curbside recycling programs that generates net positive revenue, but the overall contribution from aluminum remains a small piece of total costs. However, there can be variability in commodity prices across individual markets.

An important distinction of deposit systems is that they work well in away-from-home settings such as events, workplace, and on the road. This results in a much higher rate of deposit bottle recovery in these areas that challenge most current recycling systems. If current shortcomings are addressed, deposit systems may be able to work in harmony with curbside programs, and given the costs that would be incurred to achieve similar away-from-home results from other programs; this combination of programs could serve to increase overall system efficiency.

4) Consistency, reach and scalability

(Including the following considerations: Potential for implementation across jurisdictions (municipality to municipality, state to state, and region to region); extension nationwide; Potential to accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

A national bottle bill would require a large effort, but is possible, and has been called for by some stakeholders. This could result in a consistent system and eliminate existing concerns within states about fraudulent transport of non-deposit containers across state lines to claim deposit funds. It is also possible, given state-to-state differences in waste management and the traditional primacy of state and local governments in solid waste management issues that programs would still vary among the states, or existing state programs might be grandfathered under a federal plan. Given that the manufacturers, distributors, and retailers that play a role in the system often operate nationally, they are also well-positioned to design and operate a deposit system on a national scale. Bottle bills are effective at addressing away-from-home recycling and litter as there is a financial incentive for individuals to collect containers for redemption wherever they may be found in public areas. Beverages differ from many other consumer products, in that 30-50% are consumed away-from-home. Finally, deposits do encourage consumers to return the materials and can provide many collection / take-back locations. According to data from Onondaga County, NY, at least 65% and as much as 80% of non-returnable plastic bottles - typically bottled water - end up as *trash*; at best only 35% are recycled through the blue bin. In comparison, at least 60% -- and as much as 77% -- of *returnable* plastic containers are *recycled* through the redemption system.[18] Waste characterization studies conducted by the State of Massachusetts found a 3 to 1 ratio of non-deposit containers to returnable containers in the trash disposed, meaning there are 3 non-deposit containers in the trash for every 1 that is returnable.[19]

5) Ongoing performance

(Including the following considerations: Potential for measurable performance data, Potential to produce high-quality commodities, Potential for sufficient flexibility to allow for improvement of recycling system technology)

Measurability is also a strength of this strategy. The amount of deposits, amount refunded, amount of unclaimed deposits, and tonnage of material collected are readily available metrics, although the integrity of the data is affected by cross-border redemption and the difficulty of tracking sales for products on a state-specific basis. As discussed earlier, deposit systems also produce high-quality clean streams of

[18] OCRRA Legislative Brief provided by Tom Rhoads, Executive Director, OCRRA. Onondaga County Resource Recovery Agency (OCRRA) March 6, 2009.
[19] Massachusetts Department of Environmental Protection, "Massachusetts Waste Characterization Study", as reported by Greg Cooper, John Fischer, and Sean Sylver, 2011.

commodities, which increase the value of the collected material as well as of other materials that would otherwise have higher levels of contamination.

6) <u>Overarching considerations</u>

A) Feasibility (degree of difficulty to achieve)

(Including the following considerations: Potential for support [or lack of concerted opposition] from consumers, retailers, brand owners, and elected officials, and Political feasibility)

Bottle bill opponents include beverage container manufacturers, soft drink bottlers, beer, wine and liquor distributors and retail grocers. A new group of bottle bill opponents that has emerged in recent years consists of waste haulers and owners of materials recovery facilities who are not responsible for full system costs, and local governments who do not accurately track full system costs. These opponents want the revenue from the valuable aluminum cans that are recovered through bottle bills. Even though North American data show aluminum's contribution as a small piece of overall system revenue, this is significant to some stakeholders and concerted opposition is a sure thing. Although there is ample data demonstrating the effectiveness of deposit legislation with regard to recycling rates, opponents feel that this legislation creates undue complexity and introduces unnecessary costs. For these reasons, any new deposit legislation is likely to be a highly politically charged issue. Resistance to deposit legislation can be addressed and potentially overcome by a variety of strategies, such as:

- Re-writing "bottle bills" so the rules are clear and consistent. Container return legislation should include targets and recycling standards, transparent reporting requirements, clear definitions of roles and responsibilities, and robust governance mechanisms to resolve problems that arise. Legislation should also leave the design of the system to producers, and encourage a diversity of return channels for containers to reflect the diverse channels of distribution and sale.
- Clearly communicating true system costs, so that those who are collecting bottles and cans are aware that a deposit system will save them a lot of money, that aluminum is a loss leader, and also to communicate the consumer costs for participating in the redemption process.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

Deposits have a track record of providing excellent recovery rates. They encourage consumers to return the materials and can have a significant impact on challenges such as litter, and collections in away-from-home, rural, and multi-family dwelling settings. Beverage containers represent 17.4% of the overall packaging waste stream. Implementing deposits across the country would most certainly improve the status quo recycling rates for beverage containers, but this strategy is not likely to be as practicable for many other forms of packaging. Deposits on all packaging would be extremely

difficult to create, impose and manage. For example, corrugated cardboard already has a very high rate of recycling, and would engage a large number of additional stakeholders with a vested interest. The potential gain in recycling rate may not be justified given political challenges. If mandatory and industry-controlled, this approach for beverage containers could be part of a broader system of extended producer responsibility, or stand alone as it currently does.

C) Characterization of likely cost in relative, qualitative or quantitative terms

Deposits are promising if unclaimed deposits to run programs and funds that are intended to incentivize recycling are actually kept in the recycling system. There will be uncollected deposits and these can and should be used to increase recycling. If a partial refund is utilized, the approach provides incentive to return, as well as funding to support expanded recycling and litter pick-up. If used properly, this is an appropriate and targeted way to finance recycling. Ultimately, a deposit system can only have the potential to fund collection of the materials covered by the deposit. Unredeemed funds from deposits on one type of packaging should not be used in a significant way to fund the recycling of other packaging which does not carry a deposit.

For complete data on the container deposit laws in each state/province, visit:
http://www.bottlebill.org/legislation/usa/allstatestable.htm

C. Rate-payer Funded Strategies

Fees at Time of Recycling

For some products that contain toxic components or are difficult to manage, the market price for the recycled product is less than the costs to collect and process the material. In the absence of another financing mechanism, it is necessary for the recycler (or other entities) to charge a fee to the consumer to cover the cost of recycling the item. Examples would be fees charged by a business, landfill or recycling center at the time of return of tires or compact fluorescent light bulbs.

For the purposes of packaging, this assessment envisions a system of fees based on weight and types of material collected. Because this would create a disincentive to recycle, disposal bans are assumed to be enacted as well. This represents a significant change in policy and current practice.

1) Financial Sustainability

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

This strategy's potential to provide sustainable financial resources to the recycling system is questionable because it is dependent on consumer participation and assumes that there will be cooperation from the general public to pay for disposal (recycling) of their packaging. The fact that they will be paying after the fact, would certainly lead to expectations that participation will be an issue and might lead to illegal dumping. The financial sustainability would certainly be questionable.

Potential to make a significant contribution to a long-term solution

The strategy's potential to make a significant contribution to a long-term solution is questionable. The fees collected would have to match the cost of recovery and material processing and would vary based on location, infrastructure and market forces. Fees collected would have to be based on weight of and types of material collected. This would make it very difficult to track or verify. For instance, if there is only one hauler in a community, who would verify the costs to insure that consumers are being fairly charged? The collection would fall to either private or public schemes, and there is the possibility for competition among collectors. Most likely, this would have to revert to a subscription system of payment in order to allow consumers to budget for their recycling removal.

Potential to avoid escheats / Assure funds are used for intended purpose

Risk of escheats is not an issue with this strategy because deposits or fees are not collected in advance. However, ensuring that the funds will be spent for their

intended purpose is an issue because there are no guarantees on what will be done with the material after collection.

2) Value Chain, Communication and Action

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

Somewhat of a feedback loop would be achieved if purchase intent is impacted by the fees that consumers are paying for recycling. Certainly weight and excess packaging would be a factor that brand owners may have to pay attention to, and possibly there would be a benefit for using materials that are easily recycled, or have more value in the recycling stream. There would be very little recognition for use of recycled content, and this doesn't help motivate companies to improve material or process health or safety.

Effective consumer incentivization (through transparent cost signals or other means)

These costs will not be transparent at all. The costs to the consumer will depend on constantly changing disposal fees and how they are impacted based on material type and weight of packaging and what is collected.

Potential to influence consumer behavior in needed ways

Consumer behavior may be influenced because they will begin to understand the cost impact of what they buy and bring home as they pay for their recycling fees. However, because the disposal fees would be paid at the time of disposal and not when the product is being purchased, this influence would likely be limited.

Potential to improve recycling rates in the U.S.

This strategy would not improve recycling rates on its own. It could only do so if recycling is required by law and there are enforceable bans on putting the materials into landfills and illegal dumping. Enforcing a landfill ban on packaging would be extremely difficult and would require significant resources for the regulatory agency, and is in effect a separate strategy. Illegal dumping is already a large and expensive problem for many cities and counties. The combination of landfill bans and fees for recycling would likely increase this problem.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

There is limited feedback loop to producers; however, consumer behavior may drive package design as mentioned above.

Potential to foster innovation in processing technology

If there is competition among collectors of the material, there is the possibility to foster process innovation and technology. However, because most municipalities and communities only contract with one hauler this possibility is limited and the costs to the consumer would be very hard to control. Legislation would almost certainly be necessary to control costs and influence process innovation.

Potential to establish a level playing field between recyclables and virgin materials / encourage markets for recycled materials

This strategy would not encourage markets for recycled materials. The real issue is finding markets for all the material collected, and ensuring the quality of that material to encourage its purchase.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

Under this strategy, roles and responsibilities are not allocated across the value chain, but rest with the local municipality to enforce and to administer, either by setting up their own collection scheme or by hiring a private collector.

3) Efficiency and Cost Control

Potential to operate efficiently and reduce total system costs in the long run

There is minimal potential with this strategy to drive efficiency and reduce system costs. If enforceable, it could operate efficiently, and collect more material, but not necessarily at a reduced cost. Certainly the consumer would be paying more. There does not seem to be any incentive in the short run to improve package design. Consumer buying habits may drive efficiency in the long run.

Potential to improve the efficiency of the recycling system

The efficiency of the recycling system would likely improve because of the availability of funds to invest in equipment. There might also be sufficient funds to allow for source separation of materials, thereby improving the quality of the materials collected.

Potential for Cost control

Because fees would vary based on many factors (material type, weight, value, hauler, infrastructure, etc.), it is unclear how cost control under this system would be achieved.

4) Consistency, Reach and Scalability

Potential for implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

It is unlikely that consistent implementation of this structure would be achieved. It would require legislation across all jurisdictions, as well as require the general public to understand and accept a much higher and more complex fee structure.

Potential to accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

It would be difficult if not impossible to assign costs to multi-family dwellings, and it would certainly reduce away-from-home collection because the municipality would have to foot the bill. Lower income households would be less likely to use the system.

5) Ongoing Performance

Potential for measurable performance data

Under this strategy, any measurable performance data would come from the providers of the service. Although it might not capture the increase from current strategies, it should be able to collect relatively good data on what is being collected under this strategy since the fees being paid would be directly related to what is collected.

Potential to produce high-quality commodities

This strategy could provide high quality commodities if the fees covered the cost of source separation or technology to sort to high quality levels.

Potential for sufficient flexibility to allow for improvement of recycling system technology

There is good potential for flexibility under this strategy but it is dependent on the provider's ability to justify the cost.

6) Overarching Considerations

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

There is likely to be very high resistance to this strategy because many consumers are not now paying for recycling service today, or it is not transparent that they are paying for it.

A fee at the time of recycling is very visible, similar to Pay as You Throw. If the strategy is to collect more material for recycling there is going to be a pretty significant increase in the cost, due to the cost of improving infrastructure and quality. Understanding and managing any realistic fee structure will also add to costs and confusion about what the costs are for.
This strategy would most certainly be an issue from the multi-family and away-from-home collection standpoint, adding costs to these providers of service.

Political feasibility

Politically speaking it will be almost impossible to legislate the needed landfill bans on packaging that would be required. This will likely be viewed as a more complicated and expensive fee or tax on packaging material.

Avoidance of undue complexity for producers, retailers and consumers in implementation

The complexity of this program for consumers is tremendous. For instance, how would this system account for individual fees per consumer based on what they recycle? And producers and retailers would have no role in the system. There would also be added complexity for haulers and government.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

Degree of impact is unclear, as the strategy is conceptual only and untested. If managed by private haulers, the strategy would assume the cost burden from municipalities, but increase the burden of administering and policing the program. Trying to manage this type of program in total by a municipality would be all but impossible.

C) Characterization of likely cost in relative, qualitative or quantitative terms

Likely cost is unclear, as the concept itself is conceptual only and untested. The logistics of this strategy would pay for itself, but the management and policing by state and local agencies would go up significantly. And because the fee is going directly to the recycler there would not be a mechanism for the state and local agencies to recoup this added cost. The most likely outcome would be that consumers would pay more out of pocket (at least 30%) with more material being recovered, but it is doubtful that it would end up increasing the value or use of the material collected.

Subscription Service

A subscription service is a recycling collection service for which a household contracts directly with a waste management company, or pays for directly to the municipally contracted waste management company. The household using or subscribing to the service pays the costs of the provided service. There are many forms and constructs of subscription services and this paper generally addresses the most common arrangements at a high level.

For some households in the U.S., curbside recycling service is provided as an additional service through service contracts with waste management companies. This type of arrangement might occur in jurisdictions that do not have a municipal recycling contract with one or more vendors. Subscriptions can also be used within a county or city controlled system, including required and/or franchised subscriptions. In most cases, the waste management companies that provide household garbage collection service also provide the recycling services.

Recyclable materials generated by businesses have been determined to be interstate commodities and therefore their regulation by state or local governments is limited (although not entirely foreclosed). As a result, businesses in a given area may contract directly with another recycling hauler than the recycling hauler that is providing collection service to the residential sector in that same area.

In subscription service areas, waste management companies may be required to offer recycling to households through licensing, to meet service level requirements set in city or county code, through contracting with a local solid waste authority, or through some other mechanism.

Subscription services can be paired with a broader array of regulatory approaches such as a mandatory recycling requirement, bundled garbage/recycling services, an aggressive variable rate pricing initiative to discourage disposal, or disposal bans. These and other tools have been shown to increase the effectiveness of subscription services.

The principal benefit of subscription service is that it offers the potential for greater transparency regarding solid waste management and recycling services. Consumers are responsible for, and see or are aware of, the costs of providing solid waste and recycling collection services which may influence their decisions to recycle and/or dispose of a particular product or material.

1) Financial sustainability

(Including the following considerations: Potential to provide reasonably secure, sufficient, stable and ongoing financial resource; Potential to make a significant contribution to a long-term solution; Potential to avoid escheats and assure that funds are used for the intended purpose)

Since subscription does not rely on public funding it may be somewhat shielded from a decline in public revenues. It can avoid escheats since funds are either paid directly to the service provider or held by a contracting authority for payment to the service provider. Where multiple service providers are allowed, or where companies compete for municipal contracts or licenses, the approach may also foster greater competition among waste management companies which may spur innovation and result in more competitive rates for households.

However, subscription service fees rarely cover the full cost of recycling and recycling education within a community which may also provide other recycling collection options such as drop-off costs and away-from-home. Relying on purely voluntary subscription service generally does not meet the objectives of sustainable financing for municipal recycling (e.g., secure, sufficient, stable, and ongoing). Required subscriptions can be more effective especially when combined with bundled rates (one monthly fee that covers both garbage and recycling collection) and variable rates that are based on the size and frequency of the garbage pickup service.

2) Value chain, communication and action

(Including the following considerations: **Potential for feedback loops across the system [e.g., product design, waste collection, after-market channels] to resolve current market disconnects; Potential for effective consumer incentivization [through transparent cost signals or other means]; Potential to influence consumer behavior in needed ways; Potential to improve recycling rates in the U.S.; Potential to incentivize innovations in packaging design [e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management]; Potential to foster innovation in processing technology; Potential to establish a level playing field between recyclables and virgin materials, and encourage markets for recycled materials; Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain)**

Subscription services do not institute a feedback loop regarding end-of-life management costs that could encourage innovation in packaging design to improve recyclability or reduce overall environmental impact. Subscription based recycling programs fail to bridge the disconnect between design and marketing decisions and the costs of end-of-life management.

Some types of fee for service programs can create a financial disincentive to participation. Examples include situations where participation in garbage collection

services is voluntary and there are separate additional costs for recycling service, or the recycling service is bundled with garbage service. In either case, increased costs can discourage households from subscribing. Also, the costs for recycling on a per household basis are typically higher in voluntary subscription service areas than in those areas with mandatory services due to lack of route density and economies of scale. Other types of subscription programs can include a cost-incentive structure to encourage sign up and use of household recycling programs.

Without other incentives such as mandatory participation, bundled rates and variable rates, this strategy does not greatly influence consumer behavior given the lack of defined cost signals and the difficulty in implementing a consistent public education and outreach program for households in subscription areas.

If paired with these other policies to promote recycling and discourage disposal, subscriptions can help improve recycling rates.

Subscription service-based recycling activities have little ability to incentivize innovation in both packaging and recycling technology given the level of disaggregation in the system and lack of uniformity. Also, in some subscription service areas, since the local government is less engaged in providing or paying for recycling services, performance standards, costs, regulation and assurance of investment in MRF technology, etc., can be lax, as there is no "advocate" for the subscribers. In areas where the municipality contracts directly for material processing services, public bidding laws that require contracting with the low bidder can encourage poor sorting practices that lead to lower material quality in order to reduce costs.

3) Efficiency and cost control

(Including the following considerations: Potential to operate efficiently and reduce total system costs in the long run, Potential to improve the efficiency of the recycling system)

Relying on a "free-for-all" subscription service is generally inefficient since many haulers service the same areas on overlapping or duplicative routes, use different processors, and generate duplicative public information thus undermining the benefits associated with a coordinated system.

Franchised or required subscription services with a single service provider can operate more efficiently and help affect cost control. However, as explained above, in some subscription service areas, since the local government is less engaged in providing or paying for recycling services and there is no "advocate" for the subscribers, costs can be higher and performance lower. Alternatively, the desire to reduce costs leads directly to the production of lower quality materials.

4) Consistency, reach and scalability

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

A 'free-for-all" system could not be consistent nationally, but a franchised system could, to a degree, depending upon scale of implementation. Given the large number of decision makers in the current system, it is highly unlikely that any subscription program can be implemented with reasonable consistency across jurisdictions on a national basis. It is more likely that consistency could be achieved on a state-wide basis.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

Subscription can be implemented across jurisdictions or even on a regional basis. A ''free-for-all system" is not effective at incentivizing participation in recycling. However, franchised or required subscriptions, can achieve higher participation in recycling by households. Combining subscription services with other policy measures, such as recycling mandates, disposal bans, and variable rate pricing is needed to really incentivize participation.

This strategy is not well suited to expanding collection infrastructure in non-residential settings including "away-from-home" or public venues. This is in part due to the inability to franchise or flow control commercial recycling.

5) <u>Ongoing performance</u>

Potential for measurable performance data

Subscription programs can provide measureable performance data if data collection and reporting is included in the program design and contract.

Potential to produce high-quality commodities

This depends in large part on the collection method employed. Where recyclables are source separated by the generator, higher quality commodities are produced. Commingled or single-stream systems tend to produce lower quality materials as the drive to lower system costs combined with bidding laws, incentivize MRFs to spend less time sorting materials as long as the market value of what they produce is high enough to generate adequate revenue.

Potential for sufficient flexibility to allow for improvement of recycling system technology

Subscription service contains flexibilty, but not sufficient to drive improvements. Again, this is more dependent on how materials are collected and the nature of the contract with the contracting authority. Improvements in recycling system technology will typically require additional investments in processing technology which will result in either lower profits for the MRF or higher costs for the system subscribers. The move toward single stream or commingled recycling has necessitated improvements in recycling system technology in order to effectively separate the materials for market.

6) Overarching considerations

A) Feasibility (degree of difficulty to achieve)
(Including the following considerations: Potential for support [or lack of concerted opposition] from consumers, retailers, brand owners, and elected officials; Political feasibility; Avoidance of undue complexity for producers, retailers and consumers in implementation)

If locales are not currently using a subscription service, switching to one could be met with significant resistance, as people would now be charged for something they perceived was either free or was included in another fee or cost. There is more fairness in a subscription/user pay system; however, subscription systems that are required and/or franchised can be met by opposition from people who do not choose to recycle or use the franchised company.

Subscription approaches that are not required rely on households' commitment to recycling rather than a financial incentive to encourage recycling. Commercial recycling via subscription services are often met with resistance due to the extra bill for recycling, unless the cost of recycling is offset by a reduced garbage collection cost.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

A subscription service does not constitute a meaningful significant change from the present reality or offer the potential to do so. It may be an important step for those underserved communities that do not have any access to recycling services or that need to move recycling costs from the public budget and place them directly on the users of the service. However, it would require significant policy changes by thousands of local governments in order to have much of an impact on the problem.

This model constitutes the status quo – the current, common system which is not adequately funded and in which recycling rates are stagnant. The approach fails to adequately address key areas for recycling services such as multi-family, commercial and away-from-home options.

Pay-As-You-Throw

"Pay-As-You-Throw," also known as unit pricing or variable-rate pricing, refers to the strategy of charging residents for the collection of municipal solid waste based on the amount they throw away. The intention is to establish a direct economic incentive to recycle more and to generate less household trash. Pay-As-You-Throw (PAYT) departs from the tradition of paying for waste collection through property taxes or a fixed fee regardless of how much waste a household is responsible for generating.
Most communities implementing PAYT charge residents a variable rate depending on the amount of service they use – a fee for each bag or can of waste they generate. A small number of communities bill residents based on the weight of their trash. Individuals pay more the more they throw away, increasing the incentive to recycle.[20]

Dialogue participants differed on the question of whether PAYT constitutes an actual funding mechanism or simply a means to motivate participation in recycling programs. Participants generally agreed that the approach can play an important role in a recycling system by helping to divert material from landfills.

1) <u>Financial sustainability</u>

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

PERSPECTIVE 1: PAYT is a method of direct financing and if designed properly can provide secure, sufficient, stable, and ongoing resources. PAYT is a user fee, or a rate, like other rates, and provides cost recovery and usage signals. Just like other rates, its goals include simplicity / unambiguity, sufficiency (covering costs), stability, equity (horizontal and vertical), and many others. PAYT systems can be designed to meet these criteria; the rate-setting computations are not significantly more difficult than for other rate designs.

PERSPECTIVE 2: PAYT is an incentive rather than a direct funding method. Furthermore, bundling all costs into the disposal fee is not sustainable. As disposal amounts decrease, rates have to increase significantly.

If the costs of all services are embedded in the trash rate, there may be a "death spiral" (similar to the concerns at landfills). The trash set-outs become so low because so much material is diverted or reduced, that the rates for even very small volumes can become exorbitant. PAYT systems have been in place since before 1920 and widespread since the early 1990s. Remedies include being more judicious about costs that are embedded, and breaking some into additional user fees (e.g. higher levels of yard waste collection), or recovering some from taxes or

[20] EPA, "Pay-As-You-Throw", http://www.epa.gov/osw/conserve/tools/payt/, accessed on August 19, 2011.

other sources (environmental fee for some of the costs, or some might argue, advance disposal fees).

Potential to make a significant contribution to a long-term solution

PERSPECTIVE 1: The strategy is well-suited to serving as the financial premise for a recycling system.

The best PAYT program design (best management practices) includes recycling available for all households,[21] with the cost of this recycling service embedded in the trash rate (recovered as part of the trash bill). This is a legal, justifiable, stable source of revenue for recycling systems.[22]

Embedding the recycling cost in the bill (no separate fee) leads to significantly more recycling. Embedding the cost of yard waste collection services (no separate fee) also leads to higher yard waste diversion. However, there are several reasons for considering whether or not to provide organics service at no additional fee.[23] Considering "recycling" in the larger sense of responsible waste management / diversion (e.g., including some or all of yard waste, food waste, source reduction, hazardous waste, education), the costs may become burdensome and may led to political reactions – especially if the change is from a situation of no bill or fixed bill, to a much increased average household trash-related services bill.

PERSPECTIVE 2: PAYT is an important incentive for successful recycling systems, but it cannot realistically serve as the financial premise for a large-scale recycling system. The strategy is not readily adaptable to all households - specifically multi-family applications from urban apartments to rural trailer parks with common trash containers. While it works well in high end suburban single family development to incentivize waste reduction and recycling, there has been very limited practiced success in large multifamily settings in the US. PAYT also is not applicable to venue and away-from-home recycling. PAYT has limited value in commercial environments where the trash or recycling bill is not directly connected to the consumer. Since it therefore serves such a small portion of the entire recycling system it is not a comprehensive solution.

[21] Note that this is commonly curbside service, but many programs work very well with drop-off recyclables service only.

[22] As long as reasonably-accurate predictions are made about subscription levels (percent of customers using 30 gallons, 60 gallons, etc. of service). This is the most complex part of the rates analysis.

[23] There can be considerable differences in the amount of yard waste produced by a property – and it can be income-related, so there are equity considerations surrounding embedding of yard waste costs. In addition, households can compost in their back yard, and providing "free" organics collection reduces the incentive for that cheapest of management strategies (and recall that homes cannot "recycle" in the back yard). Communities have handled this issue in many ways – embedding organics; embedding a "first can or bag" and using a bag or sticker or subscription system for additional volumes; pay by bag programs; subscription fees, and presumably others.

Also, a concern with embedding the cost of recycling in the trash bill is that people believe recycling is free or pays for itself, and they therefore undervalue the service.

Potential to avoid the misappropriation of funds, ensuring that funds are used for the intended purpose

Funds are inherently safer from misappropriation with this strategy compared to many other approaches. The PAYT funds are rates / user fees that are kept locally at the level of the service provider. They generally do not accumulate in fund balances and are less liable to "raiding" by state or other officials during budget crunches.

2) <u>Value chain communication and action</u>

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

PERSPECTIVE 1: When PAYT is in place, there is an incentive for households to prefer purchase of goods with recyclable packaging. There are a few isolated examples of consumers in communities with PAYT successfully appealing to manufacturers to reduce packaging (ramen noodles was the example). The difficulty comes from the hassle factor of connecting with the manufacturers. Higher PAYT rate differentials, presumably, provide stronger incentives to contact manufacturers to raise the issue. Alternatively, cities (educational campaigns, listservs, etc.) or advocacy groups might serve as conduits for the information and appeals. Households / generators would reap direct benefits from these changes in design / manufacture – benefits they do not receive from non-PAYT systems.[24]

The "masses" of households would need to make the effort to express their dissatisfaction with the manufacturers of problematic products. Either the price difference would need to be enough to motivate the behavior, or the communication method would need to be relatively easy. In this day of electronic communication, that latter barrier is decreasing.

PERSPECTIVE 2: While PAYT can cause a reduction in the amount of trash set out for disposal, that does not constitute a direct feedback loop across the recycling system for product design, waste collection methodology or aftermarket channels as they relate to recycling. Waste reduction and recycling are not synonymous. Also if the feedback loop created by PAYT is simply diversion from the trash, rather than true recovery by recycling, there is inappropriate feedback. Tossing non-recyclables into the recycling container can be construed as a negative consequence of PAYT.

Potential for effective consumer incentivization (through transparent cost signals or other means)

[24] Feedback loops to waste collection and after-market channels are not clear (needs more explanation).

The PAYT incentive is an effective method of increasing single-family household waste diversion. Multiple studies have shown that PAYT provides the largest impact on recycling of any of more than two dozen changes a community (or hauler) might make to a recycling program.[25] PAYT not only encourages recycling, but also composting and source reduction / waste prevention with a total effect of 17% reduction in disposed tons, and is more effective than alternative financial incentive designs.[26] The 17% is in addition to the recycling already happening – not total – so this is a very strong addition to diversion. The literature also indicates that the cost signals can be optimized to provide strong recycling incentives.[27]

Some stakeholders raise concerns that PAYT's "cost signals" may incentivize illegal dumping. Multiple studies of this issue indicate that it does not present a problem in 80% of communities implementing PAYT, and when it surfaces as an issue, it is mostly due to bulky items, and it lasts about 3 months.[28] To address this issue (and to recognize that PAYT programs, and garbage service, must suit all households, not just "average" households) is to make certain there is a convenient, well-known method for addressing bulky items.

Some communities reportedly have chosen not to implement PAYT due to concerns about open burning/illegal dumping or theft of services (in example taking one's trash to a nearby commercial dumpster).

Potential to influence consumer behavior in needed ways

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[25] Various studies, Skumatz; 1996- 2010

[26] Skumatz et.al. "PAYT and Recycling Incentives…" *Resource Recycling*, February and March, 2011. This article shows PAYT has multiple times more tonnage impact than RecycleBank™ and costs on the order of 3-300 times less than RecycleBank™ per ton diverted, depending on assumptions made. The study also examines recycling credits.

[27] Skumatz 2001. The research indicates that the size of the rate differentials matter. A differential of 80% for double the service provides as much recycling incentive as double the rate; the authors also indicated minimum differentials that are needed to affect the positive recycling behavior.

[28] Research in PAYT communities does not indicate that illegal dumping increases significantly in response to a new PAYT system. One complicating issue is that very few communities have quantitative information on how big a problem illegal dumping is before they establish new rates, making it difficult to compare changes. Several studies have attempted to address the illegal dumping issue (based on interviews with more than 500 PAYT communities), and the conclusions are: **Low Incidence**: Illegal dumping is a problem in a minority of communities (about ¼), and all the communities surveyed said the problem was short term and illegal dumping should not be considered a barrier to PAYT. The research showed the program was a much bigger fear up-front than real experience after implementation. (Skumatz, 1993, "Variable Rates for Municipal Solid Waste Officials…", SERA, Superior CO). **Strategies**: The illegal dumping problem can be addressed and can through a variety of enforcement strategies (Skumatz, et.al.1994, revised 2001, "Illegal Dumping…", www.serainc.com). **Not Caused by PAYT**: The majority of illegally dumped material is not residential in origin – indicating residential PAYT/VR programs are not a large source of the problem (ibid). **Bulky Items**: Incorporating a bulky waste collection program (by appointment, limited number of "free bulky" tags, a charge per item, or other strategies), can go a long way toward reducing the potential illegal dumping problem, and helps make sure the PAYT program works for all residents, not just the "average" resident (ibid).

PAYT has demonstrated an ability to reduce the tonnage put into the trash can by 17%[29] (1/6 of the trash can) by incentivizing recycling, composting/organics management, and waste prevention/source reduction. Reported results of customer survey research indicated 76% have purchasing decision-making affected by PAYT, and that PAYT has a demonstrable effect on waste-generation and buying habits.[30] Households put out fewer garbage cans for collection after PAYT is implemented – partly because of declines in tonnage, and partly because cans are "stuffed" (dubbed the "Seattle Stomp"), commonly reducing the volume of trash from about 90 gallons to about 30-40 gallons.[31] Finally, PAYT can lead to significant amounts of "waste prevention/source reduction." PAYT households "source reduce" about 6% of the tons of trash put out at the curb, diverting it by buying carefully, donating to charity, buying repairable, etc.[32] These impacts have been measured independent of all the other changes that might be introduced at the same time (changes in recycling programs, etc.).[33]

Potential to improve recycling rates in the U.S.

PAYT commonly doubles recycling rates. The combined effects of PAYT on recycling, organics, and source reduction is 17%[34] less weight in household trash cans – and PAYT works in areas with either curbside or drop-off recycling programs.

The best management practices suggest the program should have the cost of recycling embedded in the PAYT trash rates, and not be hampered by an extra / additional / separate fee. An extra fee for recycling service leads to about 5-10% of households signing up for recycling, which does not achieve the goals.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

PERSPECTIVE 1: As stated above, implementation of PAYT creates an incentive for households to prefer purchase of goods with recyclable packaging. Higher PAYT rate differentials may therefore strengthen consumers' motivation to request that manufacturers adjust package design.

[29] Again, the 17% is in addition to the recycling, etc. already happening – not total – so this is a very strong addition to diversion. Recycing generally increases 50% to 100%.
[30] Skumatz 1993, "Variable Rates for Municipal Solid Waste…", for the Reason Foundation, Los Angeles.
[31] Impacts on volume are greater than impacts on tons because of the "stomping" effect. (Skumatz 1993, "Variable Rates for Municipal Solid Waste…", for the Reason Foundation, Los Angeles).
[32] Skumatz, "Source Reduction can be Measured", for EPA and others, 2001
[33] That is, adding PAYT plus single stream recycling, or PAYT plus a new curbside organics program will increase the diversion even more, but that is not the PAYT impact alone. These results are attributable to PAYT, independent of demographic and programmatic differences.
[34] Again, the 17% is in addition to the recycling, etc. already happening – not total – so this is a very strong addition to diversion.

End-of-life management responsibilities for costs are generally borne by the generators in a PAYT system. This may not be the best information method to strongly and directly encourage redesign – but it is one of the simplest.

PERSPECTIVE 2: This strategy has low potential to incentivize packaging changes as it relies on concerned citizens or local governments to contact manufacturers with complaints, and requires manufacturers to respond to those complaints.

Potential to foster innovation in processing technology

PAYT does not interfere with recycling processing innovations. In fact, as more and more tons are driven to recycling (due to the PAYT incentive), economies of scale support greater innovation and can result in greater returns to processors from those innovations.

However, if the processing innovations are related to "dirty MRFs", then PAYT does not seem like a good match.

Potential to establish a level playing field between recyclables and virgin materials / encourage markets for recycled materials

PERSPECTIVE 1: PAYT can encourage markets and partially level the playing field. The strategy leads to large increases in the amount (volumes and tons) of recyclables, and thus improves the economies of scale and helps smaller markets divert enough material to make it more economical to get to market. To some extent, the improved volumes (and innovations in processing) can improve the reliability of recycled materials, and perhaps stabilize markets.

The dimension of a level playing field between recyclables and virgin materials that is influenced by supply and demand may be addressed by the greater volumes and increased reliability of the recyclable materials encouraged by the PAYT system.[35] If / as energy rates increase, the savings from the embedded energy advantages of recycled materials should also increase. However, the portion of any differences between recyclables and virgin materials that emanate from tax incentives or other policy issues cannot be solved by PAYT. (Also, national extraction, tax policies or other strategies that make virgin materials more advantageous are not solved by PAYT.)

PERSPECTIVE 2: PAYT is effective at waste reduction and waste diversion but that is not leveling the field between virgin and recycled materials. It partially encourages markets by helping to increase the supply of material. In order to create markets both supply and demand are required. PAYT creates demand for less packaging, and while this is inherently a positive environmental attribute of the strategy it is not the same as creating a demand for recycled material. An

[35] Assuming education and processing are both optimized to achieve a reasonably clean, market-ready material stream. This is not a function or issue of the PAYT system itself, however.

unintended consequence of packaging reduction can even be the redesign toward packaging reduction at the expense of recycled content.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

Stakeholders disagree on this score. The roles and responsibilities are consistent with those characterizing the current system, with the possible incentive for disposers to contact manufacturers if they see excessive (non-recyclable) packaging costing them more money when they pay for trash.

3) <u>Efficiency and cost control</u>

Potential to operate efficiently and reduce total system costs in the long run

The strategy can produce strong incentives, but actual performance is influenced by local conditions. Even in the short run, 2/3 of communities implementing PAYT see no increase in system costs (and all expect long run savings);[36] however that depends on local variables (particularly the difference between landfill and recycling costs).

In areas where the costs will increase, they will increase less under PAYT than under other options. If the question is whether PAYT is cheaper than other options for achieving recycling (and recycling is desired, regardless of cost), then PAYT is less expensive. If the question is whether the recycling achieved is cheaper than landfilling, that varies at the local level. If there is a recycling program in place, PAYT is the cheapest way to improve its use (drop-off or curbside), which generally improves its cost-effectiveness.[37] The program does not require enhancements to infrastructure or capital stock (e.g., new trucks). Even if landfills are very inexpensive, PAYT's incentives can encourage source reduction (these tons are "zero" cost, so it lowers system costs) but the recycling that is encouraged may not be cheaper (in the short run), depending on local markets and processing. The answer to this may vary based on the local conditions (relative cost per ton of recycling vs. landfilling, adjusted by source reduction, etc.).

Potential to improve the efficiency of the recycling system

The extra recycling volumes can encourage efficiencies in processing. The PAYT system does not get in the way of any innovations in recycling collection or processing. The strategy allows and can support innovations in recycling systems. PAYT lasted through the less efficient recycling systems relying on multiple bins in the 1980s, and works with dual and single stream systems today.

[36] Frable, 1994, Iowa DNR, Skumatz 1993 - 2010.
[37] Skumatz, 1996, 1999, 2001, 2010, 2011.

Potential for cost control

The system adds little in terms of overhead, and keeps costs at a very local level – the service provider. There is not a large statewide administration system to add any cost burden. PAYT encourages efficiencies in the system, as there is no interference with additional innovation – in trash collection, in recycling, in composting, etc.

4) <u>Consistency, reach and scalability</u>

Potential for reasonable consistency across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

PAYT is currently in place in several states and many counties. Legal and other restrictions may prevent passage of national legislation requiring implementation of PAYT.

"Reasonable consistency" should probably not be interpreted as "uniformity." Key elements to successful PAYT program include the following:

1. Recycling cost is embedded in the trash rate – no separate fee.
2. Define the recycling program standards (collection at least every other week, recycle at least X materials, large container (if possible), container provided if a container is provided for trash / parallel convenience, same day collection).
3. Small container option for trash that is no larger than 32 gallons, with increasing multiples.
4. Ability to inspect hauler records for compliance, and tonnage reporting by haulers, plus designation of who is responsible for education and a minimum frequency of outreach.[38]

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

Perspectives differ. Stakeholders generally agree that PAYT with embedded recycling can work for single family and for commercial customers. It has not yet proven to work well for large multi-family buildings and does not provide much of an incentive for away-from home recycling.

If implemented under the right conditions, the strategy can be effective – with the desired diversion outcomes – for the 80%++ of waste that is generated in the single family and commercial sectors. No city interviewed suggested holding up PAYT in the residential sector because it could not be well implemented in the

[38] See sample legislation documents prepared by SERA on www.paytnow.org.www.paytnow.org. The document was partly funded by ABA.

large multi-family sector. It has shown to work well in the commercial sector, where laws are passed to say that trash bills must include the embedded cost of (some multiple of) recycling.[39]
Caveats / Concerns / Issues: The problems in the (large) multi-family sector are that generators are not the bill payers, there is anonymity if people do not comply, and there is much turnover in residents.

5) <u>Ongoing performance</u>

Potential for measurable performance data

The strategy is relatively easy to measure since collection companies can track performance and generate data. PAYT impacts can be assessed by measuring tons of trash and recycling (and yard waste, if available) pre- and post-, and/or compared to a control group. This can be at the household level or at the route or community level. It can also be measured by monitoring tons to a landfill, although that can mix the PAYT impacts with other potential effects. Studies thus far have indicated that PAYT not only encourages recycling, but also composting and source reduction / waste prevention with a total effect of 17%[40] reduction in disposed tons.[41]

Residue rates from PAYT community recycling systems deserve careful monitoring and study to ensure that the disposable of non-recyclable material is not simply being diverted to the recycling system.

Potential to produce high-quality commodities

The strategy's ability to contribute to production of high-quality commodities depends on recycling collection and processing system and on markets. PAYT produces high volumes of materials, and is compatible with a wide range of recycling programs – curbside or drop-off, commingled or separated, driver sort, manual/automated/semi-automated, all kinds of containers, etc. The quality of commodities is affected by the design of the recycling program, the education, the quality of the processing equipment (and speed, extra steps installed, etc.), the attention of processing management, and other factors – not by the PAYT program per se. Note that the quality of processing can and should be influenced by the market rewards that may be associated with cleaner/higher quality commodities. That would provide a direct influence to process materials to cleaner standards. Again, this is not a factor of PAYT.

Potential for sufficient flexibility to allow for improvement of recycling system technology

[39] Skumatz, 2010
[40] The 17% is in addition to the recycling, etc. already happening – not total – so this is a very strong addition to diversion. Recycling increases 50% to 100%.
[41] Skumatz et.al., Resource Recycling, February and March, 2011.

PAYT does not interfere with recycling processing innovations. As recycling rates increase, economies of scale support greater innovation and potentially greater returns to processors from those innovations. The strategy also does not interfere with improvements in recycling collection. PAYT has been implemented with curbside and drop-off recycling, and has been in place as curbside recycling technologies ranged from single and multiple bins, driver sort systems, automated/semi-automated/manual systems, wheelie carts, split trucks, etc. The program works with drop-off programs as well.

6. Overarching considerations

A) Feasibility (degree of difficulty to achieve)

PERSPECTIVE 1: Technically, PAYT is extremely easy to achieve. Politically, it is more difficult to establish. If political will is there, it is very easy to achieve.

PAYT systems (bags, tags, cans, billing system, setting rates, etc.) are very straightforward. Small haulers, large haulers, municipal collection, urban, rural, islands, etc. have all managed PAYT systems. The negatives are easily managed if there is a champion and/or political will on the part of the community. Studies indicate that six months after the beginning of implementation, 89-95% of the affected population prefers the new system and would not like to go back to the old one.[42] Getting political approval and weathering similar types of implementation issues that attend any program change are the hurdle.

Small haulers have expressed concerns with the strategy, since purchase of containers can be a hurdle for them. However, PAYT can also be achieved with low-cost bag or tag programs, bags in cans, and other options. The word "Pay" (in Pay-As-You-Throw) may also pose a barrier. A new name – that is as self-explanatory – may be helpful with the public (save as you throw, etc.). If a city currently provides service through tax payments, it may be more acceptable to residents if they "line item" the fee for a year or two so community members understand they have been paying for service, and then pull it out into a separate fee. It is even better to actually pull the fee out of the taxes.

PERSPECTIVE 2: It is a simple and straightforward matter to send out one annual tax bill. Creating a monthly municipal billing system for trash can become very complex, especially in areas of housing density where trash generation by household is not discretely measurable for billing. This billing challenge remains unresolved in many typical household settings, specifically multi-family and institutional settings, and settings where trash pickup does not occur at the household level. In some jurisdictions it is illegal to include a line item discussion on tax bills. Also many local jurisdictions are constrained in their legal ability to assess fees, or convert a tax to a fee.

B) Degree of impact (high, medium or low) on present challenges with financing of recycling of municipal solid waste

[42] Skumatz, 1994- 2010

PERSPECTIVE 1: This can serve as a simple, straightforward strategy for financing recycling. The strategy is self-funding; users pay, and pay in better relationship to their use of service. Residents may find the associated cost more acceptable if they see it as a "line item" for a year.

PERSPECTIVE 2: This strategy will have a low impact on the current financing problem, as PAYT constitutes status quo in many areas. Seven thousand communities already utilize PAYT and still face problems with sustainable funding. PAYT has very little to no impact on recycling problems found in multifamily, away-from-home, event or commercial contexts as it cannot be adapted to those settings.

Not every jurisdiction has the legal ability to create line item tax bills or line item fees in lieu of taxes. There are huge legal differences between taxes and fees, especially with respect to collection, delinquency and legal feasibility.

However, PAYT can be an important incentive for a robust recycling program to have in place.

C) Characterization of likely cost in relative, qualitative or quantitative terms

PAYT is a cost-effective way to increase recycling, achieve source reduction, and achieve overall diversion – arguably cheaper than other standard options. It is also cheaper than most other ways of achieving greenhouse gas reductions.

Surveys in two states found that PAYT led to no system cost increase in 2/3 of the communities in which it was implemented, with a share of those experiencing a cost decrease.[43] For GHG reductions PAYT is cheaper per metric ton of carbon equivalent (MTCE) than even energy efficiency and renewable energy options.

The actual cost will depend on the cost and efficiency of the system the community or hauler is starting with, and the choice of the type of PAYT system they are going to. This could use more study.

[43] Skumatz 1993-2010

D. Tax-payer Funded Strategies

Taxpayer-Funded

Taxpayer-funded strategies, together with subscription services (see above) comprise the overwhelming majority of community recycling programs in the United States. Therefore, taxpayer-funded strategies are likely to be a financial foundation of recycling systems for the near to mid-term in most jurisdictions. This section highlights the strengths and weaknesses of taxpayer-funded financing.

1) <u>Financial sustainability</u>

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

Under normal circumstances, and particularly in periods of economic expansion or peak, taxpayer-funded strategies can provide sufficient funding for the current outcomes of municipal recycling of packaging. However, during periods of economic contraction, taxpayer-funded strategies are less likely to provide sufficient funding as budgets are debated and limited resources re-prioritized. Furthermore, taxpayer-funding has not been shown to be easily adaptable or responsive to new needs in the recycling system.

Potential to make a significant contribution to a long-term solution

Most community recycling programs are currently funded by one form or another of taxpayer financing. Hence, taxpayer financing can continue to make a significant contribution to a long-term solution, though the success of programs (e.g., recycling rates) would be enhanced if supplemented with additional financing sources/strategies. In the current economic climate, administrators of programs around the country are facing increasing financial pressure. Raising additional tax dollars to fund recycling will be viewed as a tax increase and therefore is politically challenging.

Potential to avoid escheats /assure that funds are used for the intended purpose

Taxes collected for recycling can be diverted to other needs.

2) <u>Value chain, communication and action</u>

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

Taxpayer financing does not provide a feedback loop to consumers. When waste management costs are contained among other line items in the tax bill and therefore not transparent, citizens tend not to recognize that they are paying the costs. When costs of landfilling and recycling are not separated, there is no incentive for the consumer to adopt

one behavior over the other. Similarly, taxpayer financing of recycling for packaging does not provide a feedback loop to producers because the costs are remote and associated with the public at large. Thus, there is no financial incentive to influence packaging design (i.e., source reduction, material choice, design for recyclability).

Disposal is often a cheaper option for government operated taxpayer-financed programs. Therefore, taxpayer-funded recycling is accompanied by restrictions on landfilling of recyclable materials in some jurisdictions.

Potential for effective consumer incentivization (through transparent cost signals or other means)

Taxpayer financing may only incentivize consumers when the tax or fee structure is transparent, as when the costs of disposal and recycling are each disclosed on an itemized tax bill. Otherwise, the cost signals are very indirect, and do not provide a direct incentive to consumers to reduce waste or increase recycling.

Potential to influence consumer behavior in needed ways

As typically implemented, taxpayer funding of recycling does little to influence behavior. The greatest potential to influence consumers comes when there is complete transparency of the tax structure and taxpayers become sensitive to cost containment (e.g., they recycle more and discard less in order to reduce their tax burden), or to maximizing the environmental benefits of recycling.

Enhanced communication is needed to educate and incentivize consumers short of these economic stimuli. However, it would be difficult to raise taxes to support consumer education in traditional ways.

Potential to improve recycling rates in the U.S.

Current taxpayer-financed recycling programs in many parts of the country are viewed as underperforming. However, since some communities do significantly better than others, overall recycling rates could be improved if best practices were shared and emulated.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

In the absence of independent feedback loops this strategy has little potential to incentivize innovations in packaging design.

Potential to foster innovation in processing technology

Some communities do invest in or contract for processing and may drive for improved technology over time.

Potential to establish a level playing field between recyclables and virgin materials / Encourage markets for recycled materials

This strategy could not achieve this in isolation. Other strategies need to be implemented to influence materials pricing.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

Proactive steps among stakeholder to create feedback loops would need to be taken. The strategy in and of itself does not drive this.

3) <u>Efficiency and cost control</u>

Potential to operate efficiently and reduce total system costs in the long run

The strategy does not have a direct impact on efficiency and cost; however, with budget pressures across the country, there should be ample incentives to find efficiencies, consolidate systems, optimize operations and lower overall costs.

Potential to improve the efficiency of the recycling system

Potential for improvement will not come directly from the taxpayer-funded financing strategy, but could come from taxpayer pressure to find efficiencies, consolidate systems, optimize operations and lower overall costs (see above).

Potential for cost control

To date, existing systems have had limited ability to control costs.

4) <u>Consistency, reach and scalability</u>

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

Theoretically communities can share best practices and consolidate services. EPA and state governments can support such efforts and encourage consistency by setting standards and providing guidelines. To date, however, there is little consistency across jurisdictions.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

While this strategy has the potential to accommodate the full array of consumers, to date most taxpayer-funded systems have not achieved the desired breadth of service.

5) <u>Ongoing performance</u>

Potential for measurable performance data

Meaningful data is surprisingly lacking at this time, but it should be possible to generate data (perhaps as part of required state reporting), and link those data to best practices (total tons diverted, cost/ton, etc.).

Potential to produce high-quality commodities

Community recycling programs which are taxpayer-financed result in significant variability in their ability to produce high-quality commodities. This is, in part, due to the differences in collection and processing technology and education and outreach, all of which are factors influenced by available financing.

Potential for sufficient flexibility to allow for improvement of recycling system technology

Taxpayer funding will not drive recycling system improvements on its own.

6) <u>Overarching considerations</u>

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

Taxpayer-funding supports the majority of community recycling in the U.S., either through direct tax levies, or through subscription services (ratepayer-funded). Hence, there is widespread acceptance of this funding mechanism at present.

Political feasibility

Taxpayer financing is the status quo and waste management – of which recycling is a part – is traditionally viewed as a public service fundamental to public health, and worthy of public support. However, many recycling programs are being cut.

Avoidance of undue complexity for producers, retailers and consumers in implementation

Since taxpayer-financed recycling is currently in widespread use, it would not introduce additional complexity.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

Continuing taxpayer-funded recycling as it currently exists falls short of addressing present challenges in increasing recycling rates and recovering commodities.

C) Characterization of likely cost in relative, qualitative or quantitative terms

Many or most programs could continue at current expenditure levels, with the expectation of similar performance results. However, given the current economic situation, some jurisdictions are cutting their recycling programs.

Tax Credits or other Financial Incentives

Tax credits for natural resource industries (e.g., oil, timber, mining) are a legacy of the drive to promote resource development and westward expansion. These subsidies remain law even though they are no longer relevant to their original intent. According to the National Recycling Coalition:

> "The system-wide impacts of the subsidies impede the shift away from an extractive-based economy to a more sustainable materials economy. Subsidies have the effect of artificially lowering the price of virgin materials and disposal, which negatively impacts recycling. When a subsidy to the receiving company is not passed on to the consumer as is sometimes the case in non-competitive situations, the subsidy increases the company's profitability and ability to attract investment. **While the elimination of these subsidies is an important first step, their elimination alone will not guarantee an improvement in the market demand and prices paid for recovered materials."**[44]

There have been significant changes in the global economy over the past decade that may significantly impact the viability of this strategy.

- There is now much more offshore extraction/production (than the time period of the study) that does not necessarily benefit from U.S. tax code. Hence, elimination of tax credits may not be enough to affect overall cost structure.
- As the supply of oil continues to decline and the price per barrel continues to increase, the relative impact of the tax credit on the overall commodity price is lessened.

There are two options to this strategy. One option is to eliminate the existing tax credits to the extraction industries. The second option is to create an offsetting tax credit for the recycling industry that will level the playing field. The impacts of this second option are more difficult to identify as the offsetting credit could take many different forms. Several states have already passed legislation designed to incentivize recycling infrastructure and encourage investments in recycling. A list of these existing incentives and a 1998 report on the use of tax credits by state can be found at http://www.epa.gov/osw/conserve/rrr/rmd/bizasst/tax-ince.htm. Another form these credits could take is in the area of greenhouse gas emission reductions. It is well established that recycling reduces greenhouse gas emissions, and if a cap and trade system or other incentive programs were implemented, the recycling industry and those who use recycled content materials would be in an advantageous position to capitalize on those opportunities.

[44] The National Recycling Coalition, "Leveling the Playing Field for Recycling: A Policy Report on Virgin Material Subsidies." (September 1999).

The impacts of these two options vary; hence some of the following sections address both the tax credit elimination option and the creation of an offsetting recycling credit. In those instances, tax credit elimination is presented first and the creation of an offsetting recycling credit is presented second**.**

1) <u>Financial sustainability</u>

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

Tax credits will not provide secure or stable financial resources. They do not provide direct funding to recycling programs. An indirect impact may occur if the value of the materials collected by the programs increase thereby reducing the net costs of the overall system.

Potential to make a significant contribution to a long-term solution

If the tax subsidies are eliminated or if new tax credits for recycling infrastructure are implemented, the value of recycled materials may increase and recycling infrastructure could be expanded, but neither is likely to do so to the point where they become a significant offset to the costs of running collection programs.

Potential to avoid escheats /assure that funds are used for the intended purpose

Not applicable to this strategy.

2) <u>Value chain, communication and action</u>

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

The elimination of tax credits may result in an increase in the costs of virgin materials and perhaps encourage greater use of recycled content materials. The strategy will have no impact on waste collection.

Tax credits for new recycling infrastructure can expand recycling capacity and result ultimately in more materials being recycled but at best only provides an indirect feedback loop encouraging the use of more recycled materials.

Potential for effective consumer incentivization (through transparent cost signals or other means)

There would be no transparent cost signals under this strategy. Costs would be based on the relative cost of virgin materials to recycled materials, the suitability and availability of the materials, and the degree to which cost increases can be passed along to consumers.

Potential to influence consumer behavior in needed ways

Eliminating tax credits could result in increased costs of virgin materials and greater market value of recycled materials. If higher virgin material costs are not able to be passed on to the consumer or if manufacturers switch to more recycled content because it is more cost-effective, consumers will be incentivized to buy products using recycled content packaging.

Expanding recycling infrastructure may expand the amount and range of materials that can be effectively recycled in a given area which may in turn result in consumers diverting more recyclable materials.

Potential to improve recycling rates in the U.S.

Eliminating tax credits will not impact recycling rates directly.

Tax credits for recycling infrastructure have the potential to improve recycling rates by expanding the range of materials that can be recycled or by increasing the capacity to recycle more materials.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

The strategy may encourage greater use of recycled materials for packaging by making virgin materials more expensive.

Recycling infrastructure tax credits have not been shown to incentivize packaging design where they exist.

Potential to foster innovation in processing technology

Eliminating tax credits has no impact on processing technology.

Tax credits for new recycling infrastructure has the potential to spur innovation in processing technology.

Potential to establish a level playing field between recyclables and virgin materials / Encourage markets for recycled materials

The primary strength of both strategies is their potential to level the playing field and boost markets. Eliminating the tax credits for natural resource extraction will have a more direct effect than establishing tax credits for increased recycling infrastructure.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

Neither strategy has an impact on the allocation of roles and responsibilities across the value chain.

3) <u>Efficiency and cost control</u>

Potential to operate efficiently and reduce total system costs in the long run

The elimination of tax credits will not have an impact on system efficiencies but it may reduce overall system costs if the value of recycled materials rose as a result.

Tax credits for recycling infrastructure have the potential to improve efficiencies if new or more efficient processing technologies are utilized which may have the effect of reducing costs.

Potential to improve the efficiency of the recycling system

As stated above, the elimination of tax credits will not have an impact on system efficiencies, but tax credits for recycling infrastructure have the potential to improve efficiencies.

Potential for cost control

Eliminating tax credits will have no impact on cost control

New tax credits for recycling infrastructure may have slight impacts by enabling processors to buy new or more efficient equipment.

4) <u>Consistency, reach and scalability</u>

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

Existing tax credits are federal law and their repeal at the federal level would provide consistency across jurisdictions. The impact of the repeal on recycled material market values may not be consistent across jurisdictions as other factors such as collection. Recycling infrastructure and availability of local markets will be significant factors influencing those values.

Establishing new tax credits for recycling infrastructure has the potential to be applied consistently if established at the federal level. However, attempts to do this have not been successful and have resulted in multiple state programs which are not consistent.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

Not applicable to this strategy.

5) <u>Ongoing performance</u>

Potential for measurable performance data

The value of recycled materials could be easily tracked but there are other factors that also affect market value. It would likely be difficult to separate these impacts in order to isolate the effect of eliminating the tax credit.

New recycling infrastructure put in place as the result of tax credits can be tracked.

Potential to produce high-quality commodities

Not applicable to eliminating existing tax credits.

New recycling infrastructure is likely to lead to higher quality commodities if newer processing equipment is utilized as a result of the credits.

Potential for sufficient flexibility to allow for improvement of recycling system technology
Elimination of existing tax credits would have little direct impact on recycling system technology

Recycling system technology maybe impacted if the quantity of recycled materials increases substantially as a result of the strategy. New tax credits would accelerate the implementation of new recycling system technologies.

6) <u>Overarching considerations</u>

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

Eliminating existing tax credits is likely to be strongly opposed by the resource extraction industries which are politically powerful at the federal level. Therefore, it is unlikely that this strategy can be implemented.

Implementing tax credits on recycled commodities or infrastructure would likely meet with less resistance, other than that of limited budget flexibility to provide tax credits in this economy.

Political feasibility

For reasons stated above, it is unlikely eliminating existing tax credits could be implemented. Implementing tax credits on recycled commodities or infrastructure would be more politically feasible but difficult in this economy..

Avoidance of undue complexity for producers, retailers and consumers in implementation

There will be little if any complexity for producers, retailers or consumers from implementing this strategy.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

The strategy would likely have a low to medium impact depending on the magnitude of increases in the market value of recycled materials or the number of businesses who take advantage of the tax credits to invest in new recycling equipment or infrastructure.

C) Characterization of likely cost in relative, qualitative or quantitative terms

According to the 1999 NRC study, the subsidies to extraction industries range between $510 and $640 million annually.

According to the 1998 article by Kathern Sparks in *Resource Recycling*:[45]

- Idaho gave $14,095 in credits for its post-consumer waste credit program for the 1996 tax year.
- In Montana, the investment credit program gave $219,611 in credits to 10 taxpayers for the fiscal year ending in June 1996. For the following fiscal year, $230,031 in credits was given to 15 taxpayers.
- In New Jersey, from October 1987 through December 1996, a corporate business tax credit was given to 300 businesses, taking advantage of $146 million worth of certifications (value of eligible equipment).
- In Oregon, for the state's three programs combined, nearly $139 million in project costs have been approved to receive credit.
- California's franchise tax board estimated that $2,127,816 were claimed for the credit from 1989 to 1993, not including unused credit rolled forward to subsequent years.
- In other cases, almost no firms take advantage of the break.
- New Mexico's credit has been used by very few firms, although this could be due to the investment and job creation standards.

[45] Sparks, Kathern. "Tax Credits: An Incentive for Recycling?" Resource Recycling July, 1998.

- Colorado, Kansas and North Dakota all had tax incentive programs that were rarely used.

Note: Efforts were made to locate any existing follow-up studies quantifying the financial or recycling outcomes from the use of these credits. However, no such literature was found.

Federal Funding for Recycling Infrastructure

This strategy envisions a scenario in which Congress funds a program to improve MSW/recycling infrastructure (i.e., collection, processing, end-markets etc.). While there are not examples of such programs specifically in this realm, one could look to other sectors in which states and localities apply for grants for investment in infrastructure and technology – in this case, to facilitate recycling infrastructure. Such a program would be funded by taxpayers and managed by government.

1) <u>Financial sustainability</u>

Potential to provide reasonably secure, sufficient, stable and ongoing financial resources

If funding for this strategy can be secured once and proven successful, then it could be become secure and stable over time. Federal funding of many government programs has constituted some of the most secure and stable funding streams, particularly for infrastructure programs like transportation and drinking water. However, transportation and drinking water funding, while stable, is often insufficient to meet needs. Also, the feasibility of this strategy is its greatest challenge (see Feasibility section below).

Sufficiency may be another matter. Federal funding is rarely adequate for any program, but it could be an improvement in some areas.

If funding comes via a grant program, it is widely noted that applying for and administering federal grants has many challenges and costs.

Potential to make a significant contribution to a long-term solution

The contribution of this strategy to a long-term solution is unclear. Taxpayers fund most recycling in this country already, albeit at state or local level. While it seems unlikely that federal funding would ever supplant these current revenues and provide full funding for an integrated system, if it ever came to that level, it could serve as a financial premise.

If funding is provided via grants, federal funding can provide uniformity to programs, including materials collected and outreach, as a condition of grant approval, and leverage the power of large-volume purchasing for infrastructure development and equipment purchases. It should be recognized that federal grant systems can result in limited eligibility and increase administrative costs.

Additionally, the need to coordinate with every local government that currently has some level of decision-making authority over the solid waste collection system will create a significant barrier to uniformity at this time.

Potential to avoid escheats /assure that funds are used for the intended purpose

The basis of this strategy assumes that funding is being directed for a specific purpose. Clearly the level of funding or the requirements around its use could change, but the purpose should remain the same.

2) <u>Value chain, communication and action</u>

Potential for feedback loops across the system (e.g., product design, waste collection, after-market channels) to resolve current market disconnects

This funding system alone won't create feedback loops. Incentives and disincentives could potentially be built into the system to encourage this feedback. For example, under a grant-based system, approval could be made dependent on creation of feedback loops to multiple stakeholders like outreach to consumers, design/material interactions with manufacturers and market development activities, as well as incentives to change consumer behavior and to reward high-performing systems. Such requirements are likely to increase administrative costs however.

Funding could be available to non-governmental entities, including private service providers, private material recovery facilities and manufacturers. Depending on the design of the grant program, additional feedback loops may be possible.

Potential for effective consumer incentivization (through transparent cost signals or other means)

This strategy does not directly incent consumers. However, incentives could potentially be built into a grant-based system through grant requirements. For example, if new funding becomes available, it can be directed first into systems that provide effective incentives to consumers that alter both purchasing and recycling behaviors (see the separate assessment on Incentives).

Potential to influence consumer behavior in needed ways

This potential is unclear. Incentives and disincentives can be built into a grant-based system to encourage appropriate behavior as requirements of grant awards, which, in turn, has the advantage of encouraging behavior that will be widely accepted across the U.S. – an important consideration in our mobile society.

Potential to improve recycling rates in the U.S.

If designed to do so, federal funding for recycling infrastructure can pay for better infrastructure, drive market development, harmonize programs, and create incentives and education for consumers, all of which are proven to increase recycling rates. It can also be designed to prioritize activities that significantly increase overall and material specific recycling rates.

However, it may be more challenging for this strategy to "raise the bar" and drive improvements in communities with higher-functioning recycling programs, especially if grant funding favors those communities that demonstrate the greatest need for improvement.

Potential to incentivize innovations in packaging design (e.g., recyclability, minimizing full life-cycle costs, light-weighting, general end-of-life management)

This strategy has limited potential to incent innovations in packaging design.

Potential to foster innovation in processing technology

Federal funding could be designed in a way to foster innovation. For example, technology innovations could be given incentives over older technology.

Potential to establish a level playing field between recyclables and virgin materials / Encourage markets for recycled materials

The potential of federal funding against this criterion is unclear. Market development for recycled materials may need to be managed separately (i.e., privately) from funding of municipal recycling systems.

Potential for allowing clear recognition and allocation of roles and responsibilities across the value chain

Government would continue to provide its leading role under this strategy.

3) <u>Efficiency and cost control</u>

Potential to operate efficiently and reduce total system costs in the long run

As this strategy addresses only infrastructure, and not the total system, its potential effect on overall system efficiencies and costs is unclear. However, proper incentives and disincentives built into the funding stream could help. For example, if funding is prioritized for improving or creating efficient infrastructure, it can reduce costs. Transition from inefficient to efficient operations can be prioritized in funding. New, efficient operations would be funded next. Inefficient operations can be targeted. If the funding is not designed to gain efficiency and control costs, there is no reason to anticipate that it would succeed in this area. Evaluation of the current efficiency of each system would add significantly to the administrative costs of the program as well**.**

Potential to improve the efficiency of the recycling system

At first glance it is not evident how federal funding would improve efficiency, but with proper design and engagement by all parties, advances could be made. For example,

subsequent grant funding could be made contingent on meeting performance and efficiency standards, or making efficiency improvements (being accountable for taxpayer dollars).

Potential for cost control

Proper design and engagement by all parties holds the potential for cost control. While there are examples of federal funds not being used in the most efficient manner, other programs, such as the federal WIC program which provides funds to states and allows states to administer programs, are routinely cited for their efficiency. However, these programs benefit from the ability of the federal government to establish program guidelines applicable to all states. Conversely, solid waste systems are managed at the local government level and therefore will require a significant amount of coordination and outreach.

4) <u>Consistency, reach and scalability</u>

Potential for consistent implementation across jurisdictions (municipality to municipality, state to state, and region to region) / extension nationwide

Consistent implementation would be possible only if funding levels were adequate to support all communities. Also, if grant funding is awarded on a competitive basis to communities that demonstrate the greatest need, communities with lower-performing recycling programs are likely to receive a disproportionate amount of funding, to the detriment of other communities with a lower perceived need.

Potential to reasonably accommodate the full array of consumers (e.g., single family homes, multi-family dwellings, commercial and away-from-home sources, and underserved communities)

PERSPECTIVE #1. This strategy can accommodate the full array of consumers as funding would likely be tailored to each locality's needs

PERSPECTIVE #2. This finance strategy addresses infrastructure and end-market improvements. Hence, it does not directly provide a solution for multi-family, commercial, and away-from-home recycling, but it could potentially help if markets were stronger.

5) <u>Ongoing performance</u>

Potential for measurable performance data

Performance data requirements could be built in as a component/requirement for receiving funds.

Potential to produce high-quality commodities

As with other criteria noted above, performance standards could be tied to funding, using some market measure of high-quality commodities (e.g., market revenue as a possible measure).

Potential for sufficient flexibility to allow for improvement of recycling system technology

System technology improvements could be targeted in turn for funding to support flexible approaches for technological improvement.

6) <u>Overarching considerations</u>

A) Feasibility (degree of difficulty to achieve)

Potential for support (or lack of concerted opposition) from consumers, retailers, brand owners, and elected officials

This is the biggest challenge of all for this strategy. With a concerted effort by all parties, a credible argument can be made. Available data (quoted earlier in this paper) demonstrates that using recycled inputs conserves energy over using virgin inputs, reduces greenhouse gas (GHG) emissions, can serve as an extremely cost-efficient GHG abatement strategy.[46] These studies indicate that sizeable, critical investments in recycling can be made at a fraction of the cost of many other federal programs.

Political feasibility

Current economic and political conditions present many challenges to advancing this strategy. In order to make some headway in doing so, it would need to be preceded by agreement by all parties to pursue the strategy in coordination with each other. If such an agreement can be achieved, then federal funding could at least be pursued.

Avoidance of undue complexity for producers, retailers and consumers in implementation

This system avoids all those complexities. However, if not structured properly, it could add many complexities to government.

B) Degree of impact (high, medium, or low) on the present challenges with financing recycling of municipal solid waste

With high coordination among key constituencies and effective implementation, chances of addressing present challenges improve. If there is not coordination and effective implementation, chances decline.

[46] McKinsey & Co, "Pathways to a Low-Carbon Economy; Version 2 of the Global Greenhouse Gas Abatement Cost Curve", January 2009. http://globalghgcostcurve.bymckinsey.com/

Also, there may be potentially lower impacts in communities with pre-established high-functioning programs.

C) Characterization of likely cost in relative, qualitative or quantitative terms

An estimate of costs can be made using the following formula:

- Assess efficiency of current U.S. infrastructure.
- Determine target recycling rate by material and sector.
- Assess required collection, transportation, and processing infrastructure to meet target rates, as well as educational requirements and incentives to ensure high participation, and related costs of improvements to achieve target rates.
- Assess cost of improving each current inefficient MRF and cost of building new MRFs to meet increased demand under target rates.
- Add up costs for each refurbished or new MRF.
- Add up costs for each collection, transportation, education and additional system improvement (not already captured in MRF improvements).
- Total will equal the Total Estimated Cost of a Federal Program that builds on existing recycling programs and existing financing of those programs. This does not address funding to maintain existing programs and infrastructure, which is known to be an issue in many communities.

Possible next steps on sustainable financing

Several participants in the dialogue proposed that additional multi-stakeholder analysis and discussion of the public and private financing systems be undertaken to improve the performance of recovery and recycling of packaging and printed paper in the U.S. The objective of the proposed initiative would be to further analyze the financing options that are most likely to achieve the objective of sustainable financing of recycling at the municipal level in the United States.

Advocates for the proposal, especially participants from state and local governments and NGOs, expressed dissatisfaction with the fact that the depth of analysis on the financial strategies was limited by time and resource constraints. They believe that further cross-sector dialogue is necessary to identify and refine the most promising strategies for establishing sustainable means for financing and governance of the system. Some participants, notably a majority of participating brand owners, voiced concern that the late emergence of the proposal (toward the end of the final in-person meeting) did not permit adequate time for joint deliberation and full understanding of its implications.

The initial version of the proposal, discussed briefly by the full participant group, recommended a dedicated focus on EPR. In response to concerns about that exclusive focus, a subsequent, more broadly scoped iteration was developed following the meeting and discussed by a small, cross-sector committee. The second version suggested the following lead alternatives for further analysis: a privately funded system similar to – or based on principles of – EPR, and 2) a combination of public and private funding sources, recognizing that participants in such an effort may choose to further develop or refine the list of scenarios.

The twin purposes of the continued analysis would be to strengthen understanding of the potential of each for achieving the objective of sustainable financing, and to articulate best case scenarios for each financing option identified. This analysis would:

- Compare and analyze each approach for financing the recovery and recycling of packaging and printed materials based on the following components:
    - Economic efficiency (including but not limited to how costs are allocated throughout the material's lifecycle and the resulting impact on cost containment)
    - Performance (including but not limited to how the approach enhances the overall environmental performance of the system)
    - Stakeholder roles (including but not limited to how the contemplated roles for the players along the chain support or detract from system efficiency and performance)
    - Feedback loops which stimulate participation at each level of the system (including but not limited to whether the approach provides sufficient information to engage all players along the chain in a proactive fashion)

    - Use of fees or other financing mechanisms (including but not limited to how the specific financing mechanism influences other components of the system, and the relative merits of visible and invisible fees)
- Develop a clear understanding of the various implementation scenarios including individual versus collective responsibility approaches.
- Distinguish aspects of each approach which best accommodate the objective of sustainable financing of recycling of packaging and printed papers in the near term (less than five years) and long term (five years or beyond)
- Agree on key terms and definitions of all programs within the targeted system scenarios for packaging and printed paper, including:
    - Cost internalization (as it relates to EPR finance systems)
    - Eco-fees (as the relates to EPR finance systems)
    - Subscription services
    - Pay-as-you-throw or variable pricing strategies
- Examine the implications and attributes of the various financing mechanisms, including how the costs would be apportioned across the product chain.

IV. Strategies for Optimizing the Current System

Introduction

In an effort to optimize the U.S. materials management system for the recovery of packaging materials for recycling, a list of opportunities was created and eight key drivers for system performance improvements were selected for further work. It is vital to understanding this process that these eight drivers be seen as an interconnected whole, requiring feedback loops among the projects to achieve synergies where possible and to avoid unintended consequences of divergent work-streams. The project briefs contained in this document represent a review of each key driver. Determining the mechanisms for proceeding with actionable projects will be a major next step.

Summary Recommendations

1. Package Design and Material Recovery:

The EPA dialogue participants recommend a project to address the integral relationship between package design and material recovery for recycling. Packaging that is designed for the environment and end of life is a fundamental requirement for an effective and efficient recovery / recycling system. The objective of this project is to provide package designers with information that will enable material recovery. Project deliverables include:

1. Identify existing design for recycling guidelines that are material specific – examples of organizations with guidelines and other data include:
    a. Association of Post-Consumer Plastics Recyclers
    b. The Sustainable Packaging Coalition
    c. ISO
    d. ISTA
    e. Others as identified
2. Identify gaps in available resources (e.g., materials or types of packaging not covered).
3. Propose a feedback loop that will provide for recycler and designer collaboration at project initiation.
4. Identify paper and packaging materials and formats that are most significant in the U.S. municipal solid waste stream by weight and environmental relevance.
5. Identify material and format trends in U.S. municipal solid waste that may not be significant in terms of weight or environmental relevance today, but that are growing in importance and are underserved by existing collection and recovery for recycling infrastructure.

2. Recycling Incentives:

The EPA dialogue participants believe increasing participation in curbside and drop off recycling programs will increase recycling rates, revenues, and ultimately serve to optimize the performance of the material recovery system. Therefore, the work group recommends a project that would:

1. Identify recycling incentive programs for curbside and drop off recycling programs that have been proven to increase participation and maintain material quality.
2. Identify relevant enablers and barriers to successful implementation of effective programs.
3. Recommend potential strategies to facilitate broader implementation of effective programs.

While not a stated objective of this project, it is our belief this report could form the foundation for collaborative, multi-stakeholder efforts to expand the use of proven approaches and also address the potential use of incentives for non-curbside recycling.

3. Consumer Education:

The EPA dialogue participants believe that ongoing consumer education and sustained high levels of consumer participation would optimize the performance of the recycling system. The dialogue participants recommend the following projects to broaden recycling behavior with a focus on developing a "national norm" for recycling behavior while recognizing that specific "how to" education cannot be developed until and unless infrastructure and jurisdictional policy harmonization occurs. This project would focus on:

1. An assessment of how various approaches to messaging, including attributes and frequency, will increase consumer recycling behavior and motivation.
2. An assessment of how synergies might be created through multi-stakeholder messaging.
3. A demonstration via pilot campaigns in representative test markets with established recycling metrics.
4. A financial analysis of the levels of ongoing investment in consumer education necessary to create and sustain high participation.
5. A recommendation of options for financing the necessary levels of investment that would guarantee effective consumer education.

4. Material Collection:

The EPA dialogue participants believe the current recycling collection system needs improvement to optimize and improve material recovery. The group recommends a project to establish the highest level of knowledge on the performance of current systems. The project would:

1. Publish an authoritative report for broad use on opportunities to improve current infrastructure and collection practices in terms of capabilities and access.

2. Identify gaps in access to collection – addressing both at home and away-from-home issues - and shortfalls in the effectiveness of existing collection operations.
3. Explore the relationship between the collection system and the capabilities of the processing infrastructure as related to packaging and printed materials.
4. Assess and recommend greatest areas of opportunity to close gaps, including:
    a. Resources needed to address gaps
    b. The level of necessary financing
    c. Recommendations on potential sources of financing.

5. Material Sorting:

The EPA dialogue participants believe that improvements to the material sorting system in the United States would help optimize recycling performance. The group recommends that a specific project be undertaken to address material sorting, including:

1. An assessment of the current sortation infrastructure and its performance.
2. An identification of interventions that could improve the performance.
3. A characterization of necessary investments associated with those interventions.
4. A recommendation of financing strategies to implement the interventions.
5. Define "gold standard/best in class" for existing systems along with strategies to bring others up to that standard
6. Also define opportunities to "raise the bar" on current best in class along with strategies to execute.

6. Aftermarkets: Exchange Resource for Recovered Packaging Materials:

The EPA dialogue participants believe there is a need for a better system to link recovered materials back to uses in packaging and other products. The group recommends a project to investigate development of an online, reliable and continuously managed database of recovered and/or processed materials for recycling into packaging or other uses. The project would:

1. Improve access to materials, facilitating increased recycled content in packaging which in turn should drive market demand and incremental value for recovered materials.
2. Create markets for recovered materials which may provide for more diversity of materials recovered for new uses.
3. Increase market visibility for packaging-suitable materials that are being included in an increasing number of municipal recycling programs (e.g., polypropylene) which should allow for faster collaborations between raw material supplier and end users.
4. Drive better quality and economics for recovery/recycling by facilitating more transparent supply/demand information.

If successful, the project has potential to be expanded at a later date to include additional industry sectors for market development (e.g., plastics recycled to automotive and textiles sectors, etc.) which should further improve the financial picture for recovery/recycling.

7. Recycling Rate by Material Type

The EPA dialogue participants believe that the development of consistent, transparent, and broadly-supported data on material recycling rates for specific commodities would provide critical information for improving recycling system performance. The group recommends a project that will:

1. Provide a national survey to identify potential sources of data
2. Assess data quality
3. Recommend a process for an improved materials recycling rate measurement system.

The project will address at least 80% of all paper and packaging materials in major converted form, by weight, in U.S. municipal solid waste. It will access trade association production/export/import data in combination with MSW generation data and/or U.S Department of Commerce data. Other data sources may also be relevant.

Engagement with stakeholders who are already conducting material-specific recycling rate analyses is a requirement. Part of the project will be to identify gaps where data is missing or data collection infrastructure is not in place. The project will also address redundancies in current data and data collection processes. The project may also provide a platform for addressing the opportunities to improve EPA's Waste Characterization Study and to better align EPA's process with private sector measurement efforts.

8. System Decision-Making

The EPA dialogue participants believe that a significant challenge to optimizing the system is the diffuse and disaggregated nature of decision-making around the system. The group recommends a project that will evaluate and model the recycling decision-making framework and process in the U.S. and identify activities that improve decision-making in ways that optimize the system.

Optimization Project Details

1. Package Design and Material Collection/Recovery

Objectives	The lack of coordination between the selection of packaging materials and the design of packaging with existing end of life collection and recycling systems has been identified as significant challenge to the economics and effective recovery of post-use packaging materials. The objective of this work stream is to identify existing resources that identify what materials and design elements pose a challenge to either the collection and/or the effective recovery of paper and packaging materials
Project Summary	Packaging that is designed for the environment and end of life is a fundamental requirement for an effective and efficient recovery system. The objective of this project is to provide package designers with information that will enable material recovery. Project deliverables are: • Identify existing design for recycling guidelines that are material specific – examples of organizations with guidelines and other data include: o Association of Post-Consumer Plastics Recyclers o The Sustainable Packaging Coalition o ISO o ISTA o Others as identified • Identify gaps in available resources for design guidance. • Propose a feedback loop that will provide for recycler and designer collaboration at project initiation. • Indentify ways in which designers can be incentivized to follow the recognized, published guidance. • Identify paper and packaging materials and formats that are most significant in the U.S. municipal solid waste stream by weight and environmental relevance • Identify material and format trends in U.S. municipal solid waste that may not be significant in terms of weight or environmental relevance today, but are growing in importance and are underserved by existing collection and recovery for recycling infrastructure. Publish this information as an authoritative report for broad use to improve the materials selection and design of packaging and fitness for recovery through existing recycling infrastructure.
Expected Results & Performance Metrics	• Complete list of design guidelines that provide science based and / or data driven recommendations, reviewed by credible authorities as needed • Include gaps in data and proposed plan to mitigate gaps

	• Identification of best in class materials • Identification of emerging materials • Propose feedback process (recyclers / designers)
Project Organization	Technical resources on this subject are readily available, however, not organized to facilitate collaboration. A project team will be created that comprises key stakeholders and thought leaders from the existing packaging value chain and packaging recovery system. The work product for this team will have a significant impact on the financial performance of the packaging industry. Participation in this work team will be voluntary from those key stakeholders who will face this greatest financial impact resulting from this body of work. It will be in the interest of these organizations to donate time and services to this effort. Project facilitation may also be donated. Should this not be the situation, a project facilitator would be necessary.
Notes	How can packaging design encourage consumer recycling? How can packaging design facilitate collection of packaging materials? How can packaging design support the most common sorting technologies? How can packaging design facilitate end markets/uses for packaging materials? Ongoing support for a feedback loop process also needs to be defined. What will be the mechanism for defining actionable projects based on recommendations from this effort?

2. Recycling Incentives

Objectives	1. Identify recycling incentive programs/strategies for curbside and drop-off programs that have been proven to increase consumer participation and maintain material quality. 2. Identify relevant enablers and barriers to successful implementation of effective programs. 3. Recommend strategies for facilitating broader implementation of effective incentive programs.
Project Summary	This project would identify recycling incentive programs/strategies for curbside and drop-off programs that have been proven to significantly increase consumer participation in recycling programs. Primary focus would be research by a credible third party that would: 1. Review existing literature and survey existing program operators to determine the most successful efforts to date in the United States. To the extent it would be feasible and relevant for U.S. applications, also gather similar information for

	programs in other countries. 2. Consider a broad range of incentives including policy (e.g. PAYT), voluntary reward systems (e.g. RecycleBank), and relevant design elements of collection systems. 3. Seek studies and information sources that have impact and cost data to help enable objective comparisons 4. Describe relevant program design attributes (e.g. participants, governance, financing models, etc.) 5. Identify relevant enablers and barriers to successful implementation at both local and regional levels 6. As necessary and appropriate to identify barriers/enablers of success, conduct primary research with consumers, program operators, local/state waste management officials, other system participants. The intent would be to place an initial focus on curbside and drop off recycling and to address "away-from-home" and commercial/institutional/industrial scenarios in a subsequent phase as allowed by funding.
Expected Results	A published report that will: 1. Drive a data-based, public understanding of the most effective recycling incentive programs 2. Identify relevant enablers and barriers to successful implementation at both local and regional level. 3. Recommend potential strategies for facilitating broader implementation of successful programs.
Performance Measures Metrics	The study design will identify a set of measures to compare impacts of different approaches. Areas to address will include: 1. Participation rates 2. Impacts on material diversion and material quality 3. Sustained performance over time 4. Program costs 5. Other relevant economic and performance indicators
Assessment Areas	1. Review of existing public literature. 2. Outreach to successful program operators. 3. Outreach to trade associations, non-profits, and other organizations participating in/active in consumer incentive programs. 4. Outreach to targeted local, state, federal government officials.
Project Organization	1. Sponsoring organization(s) to fund research. 2. Financial resources for conducting research. 3. Steering committee/advisory panel to review study design and to manage RFP and selection process, to identify and provide input on potential sources of information, and to oversee the full development of the project. 4. Credible 3rd party to conduct research & publish report.
Additional	While not a stated objective of the project, the group believes the

Comments	outputs from this study could help inform future dialogue on "what must be true" to scale implementation of successful approaches. While public data exists on individual programs, we believe a comprehensive, quantitative, comparative study that highlights success drivers and barriers would provide unique value, help to inform efforts by multiple stakeholders, and ultimately serve to enable broader implementation of successful strategies. Since the nature of the report's findings will dictate the types of stakeholders who might be interested in trying to scale implementation of successful approaches, we decided not to include how action on the report's findings could be facilitated within the scope of this project. However, the report and its findings will be public and it is likely the aforementioned sponsors and steering committee would have an interest in evaluating if/how the study results could be acted upon.
Notes	How can recycling incentives/education increase participation in waste diversion programs? How can recycling incentives/education encourage demand for products whose packaging has an end of life alternative to landfill disposal? How can recycling incentives/education facilitate preparation of packaging materials compatible with available collection and sorting opportunities? How can recycling incentives/education encourage feedback to brand owners regarding packaging issues?

3. Consumer Education Program

Objectives	Develop a model multi-stakeholder public education program that is effective in increasing recycling participation. Pair well developed brand owner marketing capacity and reputation with NGO/governmental community based social marketing (CBSM) concepts to increase sustained consumer commitment to recycling.
Project Summary	• Gather existing research (e.g. NRC study from 2007 and others) / conduct new research on current consumer perception and motivators for various demographic segments with respect to recycling and consumer brands. • Characterize brand appeal associated with recycling. Identify messages that promote behavior change. • Based on research, develop a multi-stakeholder consumer education program that integrates brand attributes with identified recycling motivators. • Pilot the consumer education program in test markets to quantify changes in consumer recycling perceptions, behavior, and recovery rates.

	• Focus on developing a "national norm" for recycling behavior while recognizing that specific "how to" education cannot be developed until and unless infrastructure and jurisdictional policy harmonization occurs. • Address how to also educate to encourage demand for recycled content in packaging (participation in "closing the loop"). • Determine levels of financial support needed and potential options for sustaining the necessary levels of support to achieve effective consumer education.
Expected Project Results	The Consumer Education Program will: • Drive a research based understanding of how consumer education will yield higher participation in waste diversion programs. • Identify specific messaging to encourage consumer behavior and choice toward sustainable end of life materials management practices and products. • Determine the amount and sources of funding needed to sustain high levels of consumer participation.
Performance Measures Metrics	• Conduct market research to identify current attitudes, focus demographics, and messages that motivate behavior change. • Gather existing or conduct primary research of consumer attitude and brand appeal associated with recycling. • Recovery rates – utilize existing published recycling rate sources from pilot markets where municipalities accurately capture this data already. • Utilize existing data sources on household recycling participation rate, via selection of pilot market that already captures the info. • Quantify consumer recycling "prompts" and messages before, during, and after a pilot campaign. Correlate frequency to behavior.
Assessment Areas **Primary** **Secondary**	• Gather/conduct research to identify consumer perceptions, motivators and recycling behavior attributes. • Identify brand links to consumer behavior regarding disposition of materials at end of life. • Correlate frequency of recycling messages and prompts to consumer behavior. • Test hypothesis that consumer's respond to perceived social value in purchasing by developing messages linking sourcing, labeling, packaging perceptions, and brand identity. Determine whether brand image and connection with recycling can drive improvement in recycling rates. • Evaluate the level of necessary spending or cause marketing investment to achieve results and suggest financing mechanisms to achieve that level of spending.

Project Organization	Led by a small manageable group of stakeholders that would include representatives from a trade association, a brand owner company, a retailer partner state and local government and a non-governmental association. Future additional potential stakeholders if the project expands beyond pilot could include: Cross-Branding Opportunities with Non-CPG Brand Owners interested in similar value benefit to their image/reputation: durable goods, auto, and apparel.
Notes & Miscellaneous	• Existing landscape: CPG brand research and information partially exists but at proprietary levels. • Commitment to consumer education program may likely be brand specific, as opposed to corporate. • 2008 Study by Cone/Duke University demonstrated 28% to 78% increase in actual purchases within toothpaste and shampoo categories for well-designed cause marketing campaigns. Risk with no action: • Underutilization of existing recycling infrastructure, continued stagnant recycling rates. Miscellaneous: • Two thirds of brands now engage in *cause marketing*, 97% of marketing executives believe cause marketing to be a valid business strategy. • CBSM understanding that Community Based Social Marketing is not Social Media. Social media may be a tool in a part of a CBSM campaign. http://www.epa.gov/osw/rcc/web-academy/2010/may10.htm http://www.epa.gov/osw/rcc/web-academy/2010/pdfs/schultz5-10.pdf http://www.epa.gov/osw/rcc/web-academy/2010/pdfs/dennings5-10.pdf • Explore potential opportunities for consumer education campaign awards • Explore opportunities to disseminate this knowledge through presentations, papers, and webinars. • Explore potential to include industry sectors beyond CPGs, including: auto, tech, medical device, media, retailers, sports apparel.

4. Material Collection

Objectives	Research, validate and document current state of affairs of the existing collection infrastructure for packaging and printed materials in the U.S. and identify ways to optimize material collection.

Project Summary	• The project would utilize existing reports from reliable resources and conduct additional investigation as needed to establish the highest level of knowledge of the current state of the collection infrastructure in the U.S. • The project would seek to provide a comprehensive analysis of the strengths and weaknesses of the existing collection system, including the efficiency and effectiveness of current collection mechanisms, the extent to which all generation points are served by collection, and the gaps in service in terms of both generation points and the range of materials collected from those points (reach and rates). • The project would further identify and recommend methods to address the access, efficiency, and effectiveness issues and seek to characterize the level and kinds of investments necessary to address those issues. • The project would define "gold standard/best in class" for existing systems along with strategies to bring others up to that standard • The project would also define opportunities to "raise the bar" on current best in class along with strategies to execute those opportunities. • Finally, the project would recommend potential sources of financing for optimizing material collection. The project would be conducted in coordination with the proposed project for material sorting, recognizing the linkage between the two and aimed at finding ways to integrate project results.
Expected Results	The Material Collection Optimization Project will result in: • A comprehensive understanding of the opportunities for performance improvement in the U.S. recycled material collection system. • A specific listing of opportunities and interventions to improve material collection. • An identification of potential financing strategies to address material collection performance. • Possible tangible examples of financed interventions that have achieved actual performance improvements and demonstrate the potential of additional interventions.
Performance Measures Metrics	• Level of access to various kinds of collection services by single-family residences. • Level of access to various kinds of collection services by multi-family residences. • Level of access to various kinds of collection services by citizens in away-from-home locations.

	• Level of access to various kinds of collection services for work places. • Cost per ton of various collection services, including initial investments and ongoing operational costs. • Participation levels in various kinds of collection services by type of access. • Extent of inclusion or exclusion of specific materials in collection programs.
Assessment Areas	• Data related to curbside vs. drop off vs. other collection processes • Data related to residential, away-from-home and workplace collection. • Information on who provides different kinds of collection services • Cost data on collection services - Efficiency data (e.g., $/ton collected) • Gaps in access, effectiveness, and efficiency • Data related to collection equipment (e.g., Trucks/capitalization). • Mandated vs. voluntary programs. • Data showing reach of existing MRFs as material outlets for collection programs • Detailed descriptions of MRF capabilities to receive more collected materials. • Data related to what materials MRFs accept (single stream or other as well what materials – glass, corrugate, plastics, etc.) along with appropriate mapping to show visually (overlap with sorting work stream). MRF Collection capacity data (e.g., ton/day) and percentage utilization. • Ownership/Funding data of collection systems (public, private, hybrid) • Number & average wages of employees (jobs maintenance/creation) • Level of integration with other waste management options (e.g., landfills, composts, waste-to-energy plants). • High level cost assessment of bringing existing MRFs to standards of top performance • High level estimates of reach, recovery and recycling performance improvements attainable if those investments are made.
Project Organization	• Key stakeholders: Current EPA stakeholders; representative collection system operators, representative material processors and end-users, representative packaging and commodity groups. • Funding and project ownership must be determined.

	• Will need development of a scope of work for the assessment and a plan for the follow-up. • Linkage needed with sorting project. • Availability of resources to address collection issues identified in assessment. Identify 2-3 people from this group to serve as a "steering committee" to oversee the principal researcher(s). Presentation of findings/distribution of final report to broader group
Notes	How can a collection system facilitate convenient consumer participation? How can a collection system deliver materials to a sorting facility in a manner that reduces waste and increases the likelihood of recovery? How can a collection system provide feedback loops to non-participating or negatively participating consumers? How can collection systems facilitate higher value for materials for aftermarket use?

5. Material Sorting

Objectives	Identify and map out steps to improve the effectiveness of material sorting to help optimize the recycling system.
Project Summary	This project will assess sorting operational practices, technology, and other factors (not limited to US) to help pinpoint interventions that could increase throughput, improve material yield, quality and value, accommodate the addition of new materials in the collection system, and reduce average cost per ton. The project would further seek to characterize investment levels and targets to optimize material sortation in the short and long run. Finally the project would make recommendations how sorting improvements can be financed.
Expected Project Results	The Material Sorting Optimization Project will result in: • A comprehensive understanding of the opportunities for performance improvement in the U.S. recycled material sortation system. • A specific listing of intervention strategies to improve material sortation. • An identification of financing strategies to address material sortation performance. • Examples of financed interventions that achieve actual performance improvements and demonstrate the potential of additional interventions.

Performance Measures Metrics	• Material yield • Material quality • Quantity of throughput • Cost per ton of material processing • Availability and status of sorting infrastructure • Use of best management practices • Use of available and best technologies • The level of flexibility and adaptability of existing systems
Assessment Areas	• Inventory of sorting infrastructure, including gap analysis. • Inventory of available and best technologies, including gap analysis. • General state of material throughput, yield, and quality. • Material streams – current and potential, along with identification of materials that cannot or should not be handled by MRFs) • Cost of processing per ton. • Cost of technologies. • Costs of addressing infrastructure, technology, and best practice gaps. • Identification and planning for organizational and financing mechanisms to address sorting optimization (include R&D). • Outreach to recycling technology community. • Socio-economic implications of upgrading infrastructure – e.g., job creation, MRF working conditions, etc. • How rapidly is the infrastructure and technology changing? • Sortation post-MRF – presence of and development of supporting, downstream infrastructure.
Project Organization	• Key stakeholders: Current EPA stakeholders; representational MRF operators, representational material end-users (e.g., Paper mill, carpet manufacturer, etc.) • Funding and project ownership needed for execution. • Need for a plan for the assessment and a plan for the follow-up. • Linkage needed with other projects (e.g., problem and opportunity materials). • Availability of resources to address sorting issues identified in assessment.
Notes	How can the sorting system facilitate maximum recovery of re-useable materials? How can sorting systems provide feedback loops to consumers regarding preparation and sorting of collected materials? How can a sorting system provide a feedback loop to collection systems for delivery of contaminated materials?

	How can sorting systems maximize value of sorted materials for end of life? How does this link to package design and choices of materials in packaging? How does this project help facilitate data based feedback loops to producers on packaging materials or formats that are problematic? What will be the mechanism for defining actionable projects based on recommendations from this effort?

6. Aftermarkets – Exchange Resource for Recovered Packaging Materials

Objectives	• Produce a better system to link recovered materials back to uses in packaging and other products. • Build markets for recovered materials. • Provide a venue for End Users (CPGs and their supply chain partners – converters and raw material suppliers) to source recovered materials that meet their material requirements. • Provide a venue for recyclers to better market their materials. • Provide a venue for End Users to post information on materials they are seeking (transparency on demand).
Project Summary	• Provide an online database of recovered and/or processed materials for recycling into packaging or other uses to address a stated need for consistent, reliable sources of recovered materials. o Improve access to materials, facilitating increased recycled content in packaging which, in turn, should drive market demand and incremental value for recovered materials. o Create markets for recovered materials, which may provide for more diversity of materials recovered for new uses. o Increase market visibility for packaging-suitable materials that are being included in an increasing number of municipal recycling programs (e.g., polypropylene) which should allow for faster collaborations between raw material supplier and end users. o Drive better quality and economics in the recycling system by providing more transparent supply/demand information. • If successful, the project has potential to be expanded at a later date to include additional industry sectors for market development (e.g., plastics recycled to automotive and textiles sectors, etc.) which should further improve the financial picture for recovery/recycling.

Performance Measures Metrics	• Interactive, web-based database that is managed ongoing, not a report that is published one time.
	  o Number of users (seekers and sellers), by sector
	  o Number of materials
	  o Amount of material offered
	  o Amount of material sourced
	  o Quality of materials offered
	  o Value of materials offered/purchased (if we can get it)
	• Recommendations for process/resources to manage and administer the database ongoing (subscription service to justify costs, profit sharing? How to pay for the efforts ongoing so that the system is economically self-sustaining?)

Assessment Areas / Work Plan	1. Assessment of current resources and identification of need gaps (include assessment of WRAP in UK and other existing resources).
	2. Identification and recruitment of initial partners.
	3. Needs identification
	  o End users must identify what information they need to be able to use the database for sourcing material (e.g., source locations, volume, physical properties, chemical properties, etc.).
	  o Pressure test specification tolerances to develop the most robust system (e.g., tighter specs with supply vis a vis broader specs with demand – what is the right balance for the most efficient system?)
	4. Database design and development.
	  o Explore opportunity to augment existing resources vs. designing something new from scratch.
	  o Develop recommendation of cost/benefit of developing new vs. improving and expanding something already established.
	  o Develop recommendation for someone to host and manage the database ongoing.
	5. Recommend process to manage and administer system ongoing.

Project Organization	• Led by cross-sectional subset of current EPA dialogue group
	• See potential engagement from other resources:
	  o Academics (e.g., MSU's CPIS)
	  o Trade associations (AF&PA, APR, earth911, etc)
	  o Government (EPA, Calrecycle, etc)

Notes	Discussion Points: • Is this project just about plastics or to include other materials? • Do End Users have to be limited to packaging? Can end uses target other industries? • What other functionality may be needed?

7. After-Markets – Benchmarking Recycling Rate by Material

Objectives	Develop consistent, transparent, and broadly-supported data on material recycling rates for specific commodities would provide critical information for improving recycling system performance. Build a database that could be used to determine the recycling rate for the major paper and packaging materials by major converted form. Use this database to benchmark and measure incremental performance of recycling rate for materials by major converted form over time.
Project Summary	This project will involve a national survey of available paper and packaging data to identify potential sources of data, assess their quality, and then calculate the relevant recycling rate for materials by major converted form. Project Scope: • Data collection should address at least 80% of all paper and packaging materials in major converted forms, by weight, in U.S. municipal solid waste (including materials currently considered recyclable and those that are not). • The project will use trade association production / export / import data in combination with MSW generation data and/or U.S. Department of Commerce data. Other data sources may also be relevant. • Part of the project will be to identify gaps where data is missing or data collection infrastructure is not in place. • The project could also address drivers, issues, and a potential platform for uniform and comprehensive local program reporting.
Performance Measures Metrics	• Generation of paper and packaging materials by major converted form. • Collection of paper and packaging materials by major converted form. • Data on the amount and types of baled paper and packaging materials (e.g., material and bale spec. • Export data of material by major converted form, at national level. • Recycling rate: amount of material sorted, baled and/or sold into a market (i.e. actually recycled or reused) relative to the total amount of that material generated in MSW. • To the extent feasible, measurement of the quality of materials (e.g., typical contamination issues and rates, yield loss, etc.) • National benchmark of data completeness with regard to materials by major converted form. • National benchmark of data for material collected by major converted form.

	• National benchmark of data for collected material baled and/or sold (recycling rate by material and converted form).
Assessment Areas	• Landscape: The EPA MSW characterization report is one of the only publicly available, national resources of paper and packaging materials in the municipal solid waste stream. However, it only provides limited information on converted forms of packaging. • Opportunities presented: This project would allow a variety of stakeholders, including businesses to assess collection and recycling performance across the U.S. • This project would allow a variety of stakeholders to identify what materials are collected in high amounts and where. • Technical difficulties: Collecting the data could be challenging, but we are aware of a lot of existing through distributed sources of information. Data on converted forms will be most difficult. • Risk of no action: No reasonable basis of information to inform policymakers. Recycling continues to stagnate nationally and high demand for recycled materials continues to not be met.
Project Organization	• This is a research project to identify and summarize existing data sources, identify gaps and develop a strategy for keeping information updated. It should involve a core set of key Stakeholders and data sources. It would require a project manager with topical expertise and an outstanding network in this area. Access to key stakeholders to facilitate data collection would be critical- e.g., trade groups, MRFs, and local governments. Examples include: o The Sustainable Packaging Coalition which has compiled collection data by materials and converted forms for most packaging. o Paper trade associations such as AF&PA and the Magazine Publishers of America and likely key stakeholders for paper. o Department of Commerce and major materials trade associations that are the source of most generation data by material by converted form. o RW Beck (SAIC) and/or other consulting firms with a significant amount of expertise in this area and with experience in taking data to the state level. o MRF operators with data on what is sorted out of collected material, by material and converted form, and what bales are produced. o Recyclers who stand to profit or lose from the opportunities identified by these data. • Will need to develop a communication plan to understand how to make the product of this effort publicly available and ensure it remains relevant.

Notes	There is a lot of overlap between this project idea and the materials sorting project. • A potential outcome of project could be to develop a model (ideally web-based) for reporting at all levels – from local to regional, etc – to enable a reasonable roll-up of all available information. • Could support regional economic development initiatives and end markets and allow understanding of state by state recycling markets. • Information would support focused market development. • Information would support targeted infrastructure investment. • Information would improve accuracy of recyclability claims. • Information would facilitate investment for consumer education.

8. System Decision-Making

Objectives	Characterization of decision-making in the U.S. recycling system and identification of methods to improve this aspect of the system.

Project Summary	The project will seek to analyze the current decision-making framework and process in the U.S. recycling system and identify opportunities and barriers that affect optimization of the system. The project will also identify potential action steps to address these opportunities and barriers.
	
	The project will produce a model of decision-making within the current system, including:
	• Who makes decisions, e.g.: local governments, state governments, generators, haulers, material processors, end-users, retailers, and CPG companies.
	• What kinds of decisions they make (with examples), e.g.,:
	  o Budgetary
	  o Programmatic
	  o Policy
	  o Investments
	• What factors affect decision-making
	  o Level of knowledge and information
	  o Perceptions of roles in the system
	  o Motivations, risks, and rewards from decisions that optimize (or fail to optimize) the system
	• Consequences of the current decision-making framework and process.
	
	The project would identify initiatives and activities that would

	improve the decision-making process in regard to optimizing the recycling system, including for example: • Broadly applicable policy options • Outreach and education strategies • Possible structural changes in the governance framework and decision-making process • Identification of opportunities to provide feedback loops among the various stakeholders in the value chain. The kind of methodologies the project could utilize would include: • Researched analysis of the current decision-making framework and process • Surveys of decision-makers • Focus groups • Interaction to receive input from associations representing decision-makers To the extent possible, the project would also evaluate and characterize decision-making in recycling systems in other countries.
Expected Results & Performance Metrics	The project will result in: • A comprehensive model of the decision-making framework of the current recycling system. • An evaluation of the opportunities and barriers to optimizing recycling in the current decision-making system. • An identification of initiatives and action steps that would improve the results of the decision-making process on the recycling system. • Possible execution of specific projects to improve the functioning and effects of the decision-making process.
Project Organization	• Multi-stakeholder ownership and oversight of project and results. • A working group of system stakeholders to produce a detailed scope of work for the project and to oversee the execution of the project. • Engagement of contracted parties to conduct the project. • Funding for execution of the project.

V. Final Observations

This report constitutes the work product of several key stakeholders invited by EPA into a collaborative dialogue with one another to examine financing challenges faced by the current system for recycling of packaging and printed material at the municipal level.

Future multilateral efforts can opt to build on the assessments of key strategies for optimizing and sustainably funding the system for recycling, and perhaps identify the most promising strategies for implementation. Similarly, the array of proposed projects to reduce the burden on the current recycling system may be tested, refined and implemented via cooperation among private, public and civic sector leaders.

The dialogue was not intended to solve every relevant challenge and was constrained by time, resources, and oftentimes contrasting visions regarding scope and outcome. However, participants noted that the dialogue set a precedent for cross-sector collaboration, representing the first time such a diverse and influential array of stakeholders had assembled for focused, sustained deliberation regarding sustainable financing of recycling of packaging at the municipal level. It is hoped that the dialogue succeeded in opening new and enduring channels of communication, broaching difficult but important questions, establishing a foundation for future cross-sector efforts that can be more results-oriented, and providing the means for setting a course toward a sustainable and effective system.

Appendix A: Sample letter from state government to EPA requesting the dialogue

North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

July 14, 2009

Lisa Jackson, Administrator
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Ms. Jackson:

I am writing to request your agency's attention to one of the most critical environmental and economic issues facing communities around the country— the need for a system of financing for local recycling programs. These programs are the backbone of sustainable materials management in the U.S. Improving their performance would deliver enormous benefits, including the creation of green jobs, the conservation of resources and energy, and the reduction of greenhouse gases. However, these programs will fall short of their potential to contribute to these broad goals if they rely solely on local funding sources that are severely limited and subject to many competing demands.

The huge progress made by community recycling programs over the past two decades has stagnated at precisely the time when the commodity industries – paper, plastic, glass, aluminum, and steel – have become more dependent than ever on recovered materials. Industries in the U.S. and abroad are turning to recycled materials as their primary feedstocks because of the energy and climate change benefits and the growing scarcity of virgin resources. However, the main supply base for these recovered commodities is a local government-finance infrastructure that has little ability to expand, which presents a huge challenge to the sustainable use of materials in our country and around the world. EPA should conduct a dedicated effort to address this issue.

Successful financing and material recovery models in many European and Asian countries and the Canadian provinces of Ontario, Quebec and soon Manitoba show that there are viable alternatives to building a sustainable materials economy that depends on the local tax structure. Such policies have lead to increased recycling rates and improved efficiency in local programs, while also helping to meet the needs of the commodity industries and the increasing commitment of consumer product companies to more environmentally sustainable packaging.

To address this critical issue, I request that you consider convening a multi-stakeholder dialogue to explore sustainable financing strategies for municipal recycling. Such a dialogue must involve representatives of State and local government, not-for-profit advocacy organizations, and the manufacturers of the products and packaging that are managed in the municipal recycling stream. In doing so, the US EPA would provide a tremendous service to States and local governments in

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conserving resources and reducing waste. We think such an initiative would be especially helpful to rural and poorer communities that have particular hardships in conducting recycling programs. Such a dialogue would also ensure the achievement of EPA's Resource Conservation Challenge objectives and contribute significantly to your efforts on climate change.

Thank you for your time and consideration in this matter. I trust you will be in a position to move forward on recycling and resource conservation. Feel free to call upon me should you have any questions.

Sincerely yours,

Dee Freeman
Secretary

DAF/
cc: Mathy Stanislaus, Assistant Administrator, OSWER
Matt Hale, Director, Office of Resource Conservation and Recovery
Betsy Smidinger, Director, ORCR, Resource Conservation and Sustainability Division
Stan Meiburg, Acting Administrator, EPA Region IV

Appendix B: Dialogue Participants

The following individuals participated, at the invitation of EPA, in the Dialogue on Sustainable Financing of Recycling of Packaging at the Municipal Level. Inclusion in this participant list does not imply endorsement of the contents of this report. The listed EPA officials participated mainly as observers, providing occasional technical assistance upon request.

Lee Anderson
Director, State and Local Government Relations
General Mills

Janine Bogar
Beyond Waste Coordinator
Washington State Dept of Ecology

Alternate: Shannon McClelland
Environmental Planner
Washington State Department of Ecology

Chip Brewer
Director-Worldwide Government Relations
S. C. Johnson & Son, Inc.

Scott Cassel
Executive Director
Product Stewardship Institute

Alternate: Sierra Fletcher
Director of Policy and Programs
Product Stewardship Institute

Dan Colegrove
Senior Director, State and Local Government Affairs
Kraft Foods

April Crow
Global Sustainable Packaging Manager
Coca-Cola

Steve Danahy
Supervisor, Waste Planning & Aid Unit
Nebraska Department of Environmental Quality

John A. Delfausse
Vice President
Global Package Development
Chief Environmental Officer
Estee Lauder Corporate Packaging

Resa Dimino[47]
Special Assistant
Commissioner's Policy Office
New York State Department of Environmental Conservation

Miriam Gordon
California Director
Clean Water Action / Clean Water Fund

Garth Hickle
Product Stewardship Team Leader
Minnesota Pollution Control Agency

Jen Holliday
Environmental & Safety Compliance Manager
Chittenden Solid Waste District

Sego Jackson
Principal Planner
Snohomish County, WA

Anne Johnson
Director
Sustainable Packaging Coalition

Tom Langan

[47] Following the third in-person meeting, participated through the close of the dialogue as the representative of We Recycle!

Director
Government Relations & Public Affairs - U.S.
Unilever

Justin Lehrer
Program Manager
StopWaste.Org
Alameda County Waste Management Authority

Alternate: Debra Kaufman
Senior Program Manager
StopWaste.Org
Alameda County Waste Management Authority

Kim Lymn
Senior Manager, Packaging
Target Corporation

Robert "Bob" Mann
Founder, Bridging the Gap, Inc.
Co-Director, Shadowcliff Lodge

Jack McAneny
Associate Director, Global Sustainability
Procter & Gamble

Scott Mouw
Director
North Carolina State Recycling

Joan Pierce
VP, Global Packaging
Global Supply Chain
Colgate-Palmolive

Tom Rhoads
Executive Director
OCRRA

Alternate: Andrew Radin
Director of Waste Reduction and Recycling
OCRRA

Bill Sheehan
Executive Director
Product Policy Institute

Kate Sinding
Senior Attorney
Natural Resources Defense Council

Bill Smith
Senior Environmental Specialist
City of Tacoma Solid Waste Management

Theresa Stiner
Environmental Specialist Senior
Iowa Department of Natural Resources
Land Quality Bureau

Gail Tavill
Vice President, Sustainable Development
Research, Quality & Innovation
ConAgra Foods

Brad Wolbert
Hydrogeologist
Wisconsin Department of Natural Resources

Russ Wood
Senior Director of Responsible and Sustainable Sourcing
PepsiCo[48]

Amy Zettlemoyer-Lazar[49]
Packaging Director
Walmart and Sam's Club

USEPA (observers, in convening role)

Sara Willis Hartwell
US EPA
Senior Policy Advisor
Office of Resource Conservation and Recovery

[48] PepsiCo was initially represented by Beth Sauerhaft, Senior Manager, Environmental Stewardship, Pepsi Beverages America.
[49] Represented at the first meeting by Miranda Ballentine, Director of Sustainability, Walmart Stores, Inc.

Jay Bassett
Chief, Materials Management
USEPA Region 4

Kent Foerster
US Environmental Protection Agency
Office of Resource Conservation and Recovery

Chris Newman
Materials Management Branch
U.S. EPA Region 5

Facilitators

Jody Erikson
Senior Associate
The Keystone Center

Suzan Klein
Associate
The Keystone Center

John Lingelbach[50]
Principal
Decisions & Agreements

Brad Sperber
Senior Associate
The Keystone Center

[50] Participated from the commencement of the dialogue through the first in-person meeting.

Appendix C: Glossary of Terms

Away-from-home Recycling – Recycling in public places such as parks, stadiums, convention centers, airports and other transportation hubs, shopping centers, and at special events.

Consumer Packaging – The system of packaging materials that holds a product or group of products, including primary (bottle, can, jar, carton, etc.), secondary (encloses the primary packaging, such as a box around a tube or bottle) and tertiary (transportation) packaging. Consumer packaging 1) protects the product from physical damage, 2) provides chemical barriers (light, moisture, O2, CO2, etc), 3) provides information to consumers (some required by law) and 4) provides "theater" (buy me!).

Curbside Collection – Collection strategy for recyclables, managed by local government or through private contract, where recyclables are collected from a home or business location, such as the end of driveway or "curbside" on a pre-determined schedule.

Disposal Ban – A disposal ban prohibits designated types of waste from disposal at landfills and incinerators.

Diversion – Waste diversion is the prevention and reduction of generated waste through source reduction, recycling, reuse, or composting. Waste diversion generates a host of environmental, financial, and social benefits, including conserving energy, reducing disposal costs, and reducing the burden on landfills and other waste disposal methods

Drop-off Collection – Centralized collection strategy for recyclables, including packaging and electronics, where consumers deliver the material to the collection site. Drop off collection sites may be staffed or unstaffed, and may be open round the clock, or available on a pre-determined schedule.

End-of-life Management – Management of materials and products at the end of their useful life, includes recycling, composting, combustion with energy recovery, other waste-to-energy strategies like anaerobic digestion, and burial in a landfill.

Extended producer responsibility (EPR) – A policy approach in which the producer's responsibility for its product extends to the post-consumer management of that product and its packaging. The approach assumes that the producers of products should bear a significant degree of responsibility (physical and/or financial) not only for the environmental impacts of their products downstream from the treatment and/or disposal of the product, but also for their upstream activities inherent in the selection of materials and in the design of products.

> OECD defines EPR as an environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle. An EPR policy is characterized by: (1) the shifting of responsibility (physically and/or economically; fully or partially) upstream toward the producer and away from municipalities; and (2) the provision of incentives to producers to take into account environmental considerations when designing their products. While other policy instruments tend to target a single point in the chain, EPR seeks to integrate signals related to the environmental characteristics of products and production processes throughout the product chain.

Full Cost Accounting – An approach to identifying and assessing the cost of managing solid waste operations, and assisting with short and long-term program planning to help identify measures for streamlining and improving operations. Unlike other common methods of accounting that record only current outlays of cash, FCA takes into account all of the monetary cost of resources used or committed to MSW programs, which may differ from cash outlays. FCA recognizes economic, environmental, health, and social costs of an action or decision. It traces direct costs and allocates indirect costs.

MRF (**materials recovery facility** or **materials reclamation facility** or **materials recycling facility)** – A specialized plant that receives, separates and prepares recyclable materials for marketing to end-user manufacturers.

Municipal Solid Waste (MSW) – Includes durable goods, non-durable goods, containers and packaging, food wastes and yard trimmings, and miscellaneous inorganic wastes generated by households and commercial establishments, and usually collected by local government bodies . MSW does not include industrial, hazardous, or construction waste.

Pay-As-You-Throw (PAYT) – A unit pricing or variable-rate pricing waste management strategy, where residents are charged for the collection of municipal solid waste based on the amount they discard, creating a direct economic incentive to recycle more and to generate less waste. Traditionally, residents pay for waste collection through property taxes or a fixed fee, regardless of how much—or how little—trash they generate. Pay-As-You-throw (PAYT) breaks with tradition by treating trash services similar to electricity, gas, and other utilities. Households pay a variable rate depending on the amount of service they use.

Post-Consumer – A material or finished product that has served its intended use and has been diverted or recovered from waste destined for disposal, having completed its life as a consumer item. Post-consumer materials are part of the broader category of recovered materials.

Pre-Consumer – Refers to materials generated in manufacturing and converting processes, such as manufacturing scrap and trimmings/cuttings. Also includes print overruns, over issue publications (newspapers and magazines), and obsolete inventories.

Processing facilities – Intermediate operations that handle recyclable materials from collectors and generators for the purpose of preparing materials for recycling (material recovery facilities, scrap metal yards, paper dealers, and glass beneficiation plants). Processors act as intermediaries between collectors and end users of recovered materials.

Product Stewardship – A policy approach where all parties involved in the life cycle of a product share responsibility for the impacts to human health and the natural environment resulting from the production, use, and end-of-life management of the product.

Source Reduction – Refers to reducing waste by not producing it at all. Source reduction can be achieved by changes in the design, manufacture, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they become municipal solid waste.

Sustainable Financing – A method of financing that provides secure, sufficient, stable and ongoing financial resources. Note: "sufficient" includes concepts such as "timely," "full costs," and "meets goals," and "stable" includes the notion that funds are used for their intended purpose and are not susceptible to being diverted or raided.

Sustainable Packaging (definition from the Sustainable Packaging Coalition, **www.sustainablepackaging.org**) –

- Is beneficial, safe & healthy for individuals and communities throughout its life cycle;
- Meets market criteria for both performance and cost;
- Is sourced, manufactured, transported, and recycled using renewable energy;
- Optimizes the use of renewable or recycled source materials;
- Is manufactured using clean production technologies and best practices;
- Is made from materials healthy in all probable end of life scenarios;
- Is physically designed to optimize materials and energy;
- Is effectively recovered and utilized in biological and/or industrial closed loop cycles.

No ranking is implied in the order of definition criteria.