Attachment D

Bay Area Hazardous Waste Management Facility Allocation Committee

Administered by:
Association of Bay Area Governments

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Date: November 24, 2009

To: Hazardous Waste Management Facility Allocation Committee

From: Ceil Scandone, Senior Regional Planner

Re: Extended Producer Responsibility: Legislative Preview

Executive Summary

There is mounting evidence of the need for, and great value in establishing Extended Producer Responsibility (EPR or Product Stewardship) rules for a range of products. The attached white paper authored by Rob D'Arcy, Hazardous Waste Management Committee Alternate, lays out the financial, environmental and other challenges local governments face, as both the volume and toxicity of discarded products grows.

In addition to relieving local government of the financial and other burdens of managing the growing number of products deemed hazardous or toxic by shifting that responsibility to the producers, EPR may have other benefits. The attached paper published by the Product Policy Institute (http://www.productpolicy.org/) discusses EPR's potential value in helping to reduce greenhouse gas emissions and combat climate change.

A number of EPR bills introduced in 2009, including AB 283, which would establish a comprehensive EPR framework, became 2-year bills and are on the agenda for 2010. Rob D'Arcy will provide overviews of those bills. Rob is the Chair of the California Product Stewardship Council, an organization of local government agencies formed to vigorously pursue producer responsibility legislation.

Action Possible: The Committee may make recommendations on bills to ABAG's Legislation and Governmental Organizations Committee and/or give staff direction on activities to pursue.

Discussion

For the last several years the Committee has been concerned about the growing volume of hazardous and toxic consumer products, such as computers, batteries, fluorescent tubes, and paints that foul the environment, overwhelm household hazardous waste programs, and strain local budgets. The Committee has monitored EPR and other relevant legislation as a means of addressing these burdens. Staff have forwarded recommended positions to ABAG's Legislative & Governmental Organizations (L & GO) Committee for review and action. This year we will continue that practice.

At it's November 19th meeting, the L & GO Committee enthusiastically agreed to put EPR on its list of legislative priorities for the 2010 session. The ABAG Executive Board subsequently approved L & GO's recommendation that ABAG aggressively pursue

legislation addressing EPR, and hazardous waste issues. Committee staff will work with L & GO staff to ensure the Committee has the most current information. Fortunately, Hazardous Waste Committee members Mark Luce, Mark Green, and Barbara Kondylis also serve on L & GO, and can ensure that EPR remains a legislative priority.

During 2009, several Product Stewardship bills were introduced. Four became two-year bills and will be taken up again in the 2010 session. One of the four, AB 283, would establish a comprehensive Extended Producer Responsibility Framework and address a wide range of products. The others address specific products, including architectural paints, pharmaceuticals and sharps, and motor vehicle brake pads. The brief summaries of the four bills listed below were copied from the California Product Stewardship Council website at http://www.calpsc.org/policies/state/2010_legislation.html. A Fact Sheet for AB 283 is included in the packet.

- AB 283, Chesbro – **California Product Stewardship Act: SUPPORT**

  This bill would create the California Product Stewardship Act and require the California Integrated Waste Management Board (CIWMB) to administer the program. The bill puts into law the EPR Framework adopted by the CIWMB in January 2008 which was strongly supported by CPSC.

- AB 1343, Huffman – **Architectural Paint Recycling: SUPPORT**

  CPSC worked closely with the authors office, the National Paint and Coatings Association, the California Retailers Association, and Californian's Against Waste to incorporate amendments submitted in January by CPSC to ensure this is a strong EPR bill that will provide a paint stewardship program that aligns closely with the EPR policy framework adopted by CIWMB.

- SB 26, Simitian – **Home-Generated Pharmaceutical and Sharps Waste: SUPPORT**

  California's Senate Bill 26 was suspended in committee so that it may not be amended, passed, or killed this year. The earliest the Legislature may choose to act upon the bill is at the beginning of 2010. Meanwhile, the criteria and procedures the CIWMB developed with stakeholders input is the leading officially-sanctioned guidance for pharmaceutical collection in California.

- SB 346, Kehoe – **Brake Pad Partnership Legislation: SUPPORT**

  This bill would require the Department of Toxic Substances Control to conducta baseline survey to determine the concentration levels of nickel, zinc, and antimony in motor vehicle brake friction materials, to monitor concentrationlevels, allows the Department to establish maximum concentration levels and phases out the sale of certain friction materials and restricts the use of copper. The bill would also creates a funding source for compliance through the administration of a fee on the sale of brake pads.

Attachments:
Fact Sheet for AB 283
The Road to Product Stewardship: Local Government as Catalysts
Products, Packaging and US Greenhouse Gas Emissions

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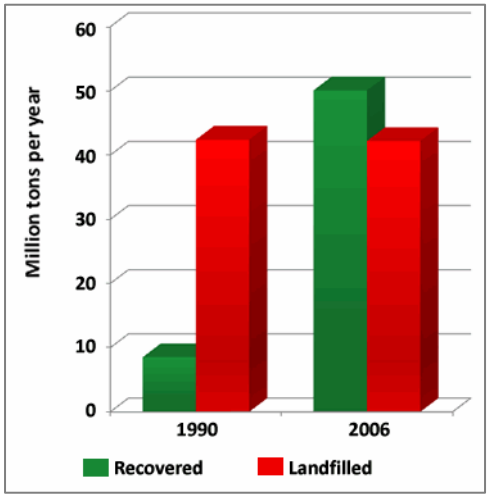
FACT SHEET FOR AB 283 - California Product Stewardship Act

SUMMARY

AB 283 proposes a comprehensive **Extended Producer Responsibility (EPR) Framework** which would establish one law to address a wide range of products that end up in California landfills and have a significant impact on our environment and on local governments, which must manage waste.

California passed AB 939 in 1989, which established a waste management hierarchy that places waste reduction first. However, since that time, waste generation in California during good economic times has continued to climb. Local governments are mandated to solve this problem, but currently the "solutions" are at the back-end - disposal, rather that at the front end – product design and source reduction. The manufacturers of the products continue to have no responsibility for the end-of-life (EOL) management of the products they create and local governments remain powerless to affect design and waste reduction. The chart below demonstrates that even with great achievements in new recycling programs, it is not enough to reduce waste.



An EPR Framework provides producers the flexibility to customize individual product stewardship plans and implement the most cost-effective and business friendly approach for any particular product or product category. Furthermore, it encourages green design and reductions in disposal, toxic releases, and emissions of climate change gases in order to protect human health and our environment.

AB 283 will finally codify a shared responsibility approach and authorize industry to develop cooperative stewardship plans for the management of problem products. These plans would be submitted to the California Integrated Waste Management Board for review and to check for completeness of content, but the producers, *not* government, would design the collection system.

EPR is proven to create jobs, reduce GHG emissions, and stimulate the economy as documented in the economic study done for British Columbia in January 2009 at http://www.calpsc.org/policies/docs/2009/2009-01-07_BC-Product-Stewardship.pdf

PROBLEM

Since California enacted its groundbreaking **recycling legislation** (AB 939, 1989), we have created 22 new programs to regulate the EOL management of products. Rather than implementing separate laws to address environmental concerns for every individual product, AB 283 is a comprehensive **Extended Producer Responsibility (EPR) Framework** which addresses a wide range of products that end up in California landfills and cause significant environmental problems. AB 283 provides a holistic approach to managing product waste but still allows flexibility for individual producers and industries to develop plans based on the uniqueness of each product.

BACKGROUND

The EPR Framework is a strategy to share responsibility among those who make, sell, use, and dispose of products, but places the primary responsibility on producers because they have the greatest ability to reduce their product's lifecycle impacts. In other words, all those who benefit from a product would share in the costs associated with the environmental impacts of the product. By having producers share in the costs of managing product discards, EPR harnesses the power of the free market to drive environmental improvement. EPR is a great economic stimulator as there are more jobs created for recycling than are utilized for landfilling.

SUPPORT

1. Alameda County StopWaste.org
2. American Federation of State, County and Municipal Employees – AFL-CIO
3. Californians Against Waste
4. California Association of Environmental Health Administrators
5. California Conference of Environmental Health Directors
6. California League of Conservation Voters
7. California Resource Recovery Association
8. California Retailers Association (w/concerns)
9. California Product Stewardship Council
10. California Senior Legislature
11. California State Association of Counties
12. Central Contra Costa Sanitary District
13. Central Contra Costa Solid Waste Authority
14. City and County of San Francisco
15. City of Chula Vista
16. City of Cupertino
17. City of Freemont
18. City of Lathrop
19. City of Napa
20. City of Oakland
21. City of Santa Cruz
22. City of Stockton
23. City of Sunnyvale
24. City of Union City
25. City of Torrance
26. Clean Water Action
27. Coastkeeper
28. Contra Costa Clean Water Program
29. County of San Joaquin
30. County of Marin
31. County of Napa
32. County of Santa Barbara
33. County of Santa Clara
34. County of Solano
35. County of Sonoma
36. County of Tuolumne
37. Defenders of Wildlife
38. Del Norte Solid Waste Mgt. Authority
39. Environment California
40. Green Cities California
41. Green Shangha
42. Heal the Bay
43. Humboldt Waste Management Authority
44. League of California Cities
45. Longbeach Organic
46. Marin County Hazardous & Solid Waste Management Joint Powers Authority
47. Marin Sanitary Service
48. Mendocino Solid Waste Management Authority
49. Napa Recycling & Waste Services, LLC.
50. Natural Resources Defense Council

51. Planning and Conservation League
52. Product Policy Institute
53. Product Stewardship Institute
54. Regional Council of Rural Counties
55. Republic Services, Inc.
56. San Diego Coastkeeper
57. Santa Clara Valley Water District
58. Santa Cruz County
59. Sierra Club California
60. Santa Monica Baykeeper
61. SLV Redemption/Recycling Centers
62. Solid Waste Association of North America
63. Sonoma County Waste Management Agency
64. Surfrider Foundation West LA/Malibu Chapter
65. Peninsula Packaging LLC
66. Tamalpias Community Services District
67. TDC Environmental
68. Teleosis Institute
69. Warner Brothers Entertainment
70. 7th Generation Advisors
71. PRO Europe – Packaging Recovery Organization
72. Austrian Ministry of Agriculture, Forestry, Environment and Water Management

OPPOSE

1. Alliance of Automobile Manufacturers
2. American Chemistry Council
3. American Forest and Paper Association
4. AstraZeneca
5. BIOCOM
6. California Chamber of Commerce
7. California Council for Environmental and Economic Balance
8. California Film Extruders and Converters Association
9. California Grocers Association
10. California Grocery Manufactures Association
11. California Healthcare Institute
12. California League of Food Processors
13. California Manufacturers & Technology Association
14. California Paint Council
15. Cal-Tax
16. Chemical Industry Council of California
17. Consumer Specialty Products Association
18. Dart Container Corporation
19. Family Winemakers of California
20. Glass Packaging Institute
21. Grocery Manufacturers Association
22. Industry Environmental Association
23. Information Technology Industry Council
24. Lassen Regional Solid Waste Management Authority
25. National Paint and Coatings Association
26. Merck and Co, Inc.
27. Pactiv Corporation
28. Personal Care Products Council
29. Pharmaceutical Research and Manufacturers of America
30. Proctor & Gamble
31. Soap and Detergent Association
32. Tech America
33. TechNet
34. Western Growers
35. Western States Petroleum Association
36. Western Wood Preservers Institute

ASSEMBLY APPROPRIATIONS COMMITTEE 5/28/09

Bill was held in the suspense file.

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The Road to Product Stewardship:
Local Government as Catalysts

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October, 2009

Special thanks to Bill Sheehan of the Product Policy Institute, Heidi Sanborn of the California Product Stewardship Council, Mary Bell Austin of the County of San Mateo and Wendy Fong of the County of Santa Clara.

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EXECUTIVE SUMMARY

Product Stewardship: Changing Materials Design and End-of-Life Management

"Extended Producer Responsibility (EPR), or Product Stewardship, means whoever designs, produces, sells or uses a product takes responsibility for minimizing its environmental impact through all stages of the product's life cycle. And the producer, having the greatest ability to minimize impacts, has the most responsibility. Product recycling should be an extension of the marketing system, mirroring the production and distribution process in a kind of "reverse retail" process; and it should be managed through commercial arrangements — all as part of excellent customer service".[1]

Broken System Overwhelms Local Government, Endangers Public Welfare

A century ago, local governments were able to protect human health and natural resources by managing household waste as a public service. The intervening decades brought enormous changes in manufacturers' ability to synthesize chemicals, produce inexpensive, 'disposable' goods, and operate multi-national systems for sourcing, manufacturing, packaging, and transporting products. In the absence of regulations requiring basic stewardship practices on the part of producers, both the volume and toxicity of product waste have increased exponentially, in ways that local governments have no control over.

The State of California has responded to individual product threats to health and safety at end-of-life by banning them from landfills. Local governments have established Household Hazardous Waste (HHW) Programs for residents and small businesses as a safe disposal alternative. HHW Programs statewide have become the default collection mechanism for a growing list of problem products common to households and small businesses. Although HHW programs on average serve less than 7% of the households in any jurisdiction and collect a small fraction of the products they are intended to target, they are costly to operate and stretch local government budgets beyond their limits.

California HHW programs face multiple challenges:

1. Existing collection infrastructure is inadequate to manage the current amount of hazardous products, let alone the vast amount of new Universal Waste banned from the trash.
2. HHW collection services are not perceived as being convenient by residents needing to dispose of commonly used products.
3. California residents are not aware of the landfill ban for Universal Waste in 2006 or the sharps ban of 2008.
4. HHW programs do not have adequate funding to expand the service to collect and process Universal Waste through the HHW collection infrastructure.
5. Even if they were able to collect all the hazardous products in the waste stream, local government HHW programs have no influence or effect on reducing toxicity through better product design.

Local Governments as Catalysts for Change

This fiscal and public welfare crisis demands a long-term solution. An Extended Producer Responsibility approach, as demonstrated in successfully operating programs in Canada, Europe, Japan and South Korea can benefit consumers, manufacturers, and retailers, in addition to local

[1] California Product Stewardship Council, http://www.calpsc.org/solution/index.html, 2009

ratepayers and the governments who serve them. To achieve a change meeting both the public interest and business interests, the State must take the lead in creating a legal framework and producers must come to the table to design implementation systems that work for their product lines. Currently local governments are exploring a variety of strategies to catalyze these key players to meaningfully engage in the process of creating systems appropriate to the communities and markets within the United States.

PROBLEM PRODUCTS

U.S. EPA data establishes that 75% of the municipal waste stream is made up of products and packaging. A significant and growing share of these products contain hazardous constituents, and are banned from the landfill at the end of their useful life. Because the HHW programs around the state are identified as the primary collection mechanism, substantial infrastructure and funding are necessary to collect and manage these wastes. The following description of a few problem waste streams is not inclusive of all products dealt with through local governments programs, but is meant to illustrate the gravity of the current situation facing HHW programs.

Paint

Paint, by far, is the largest waste stream collected by local government HHW programs, and is typically the most costly. In Santa Clara County over 2 million pounds of paint are collected annually at a total cost of over $1,600,000 (about a $0.80 per pound). Roughly 49% is latex paint and the remainders are other architectural coatings, such as oil paint. As environmental awareness grows, paint volumes turned in for recycling or disposal continue to increase.

Chart 1

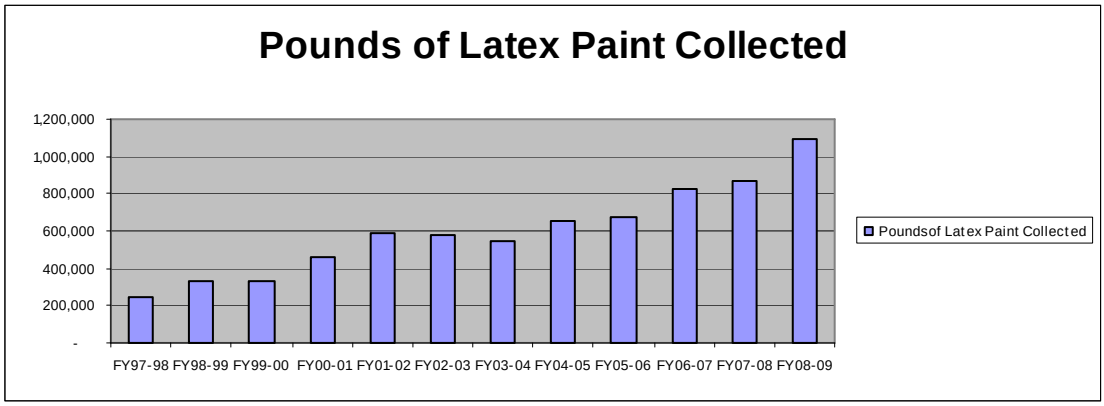
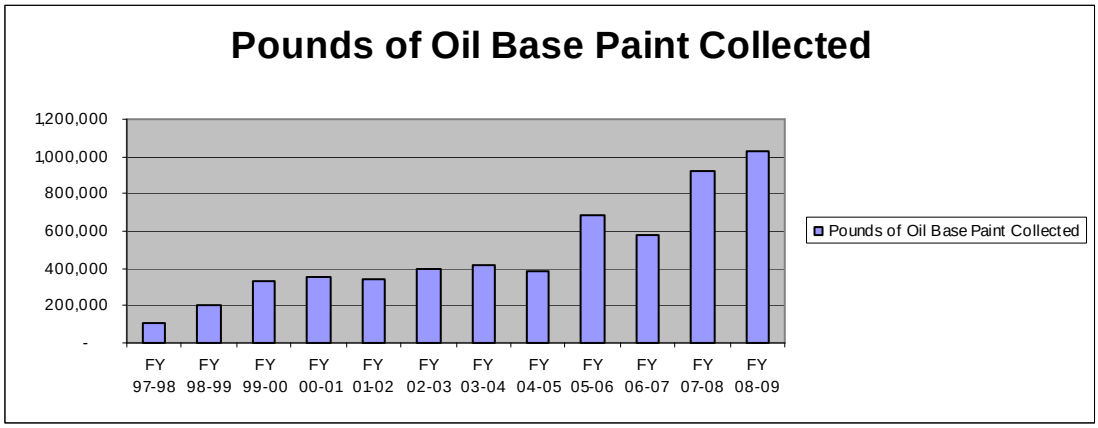


Chart 2



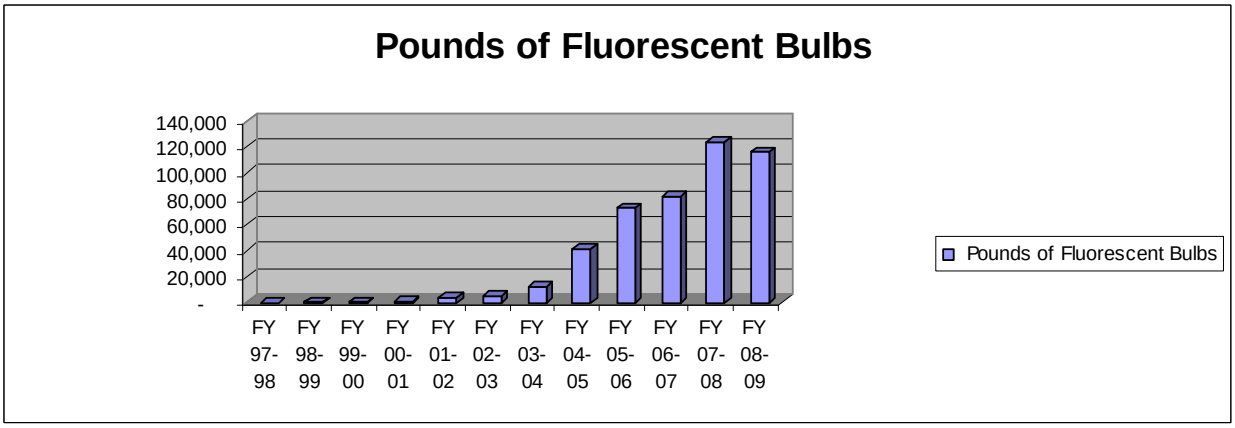
Universal Waste

On February 9, 2006, common household products that are widely used and containing toxic substances (such as fluorescent lamps, alkaline batteries and a vast array of electronic products) were banned from all landfills in California. Aside from the challenge to local governments of notifying consumers of the new disposal restrictions, the projected volume of these "Universal Wastes" (UW) generated by households and small businesses in California will far exceed the programs' current physical and financial capability. Costs in Santa Clara County alone could increase from $4 million to $8 million per year to comply with the new regulations. Compliance under existing infrastructure and funding cannot be achieved. Moreover, improperly discarded products are increasingly recognized as a threat to human health and wildlife.

Fluorescent Lighting

Fluorescent lamp collection is one of the fastest growing segments of the HHW waste stream. At the time of the landfill ban in 2006, there were no safe, convenient and free options for residents to dispose of lamps except local government funded HHW programs. In FY 2005, the HHW Program collected and recycled 41,000 pounds of fluorescent lamps. In FY 2008 the Santa Clara County program collected and recycled 123,000 pounds of fluorescent lamps at a cost of over $300,000.

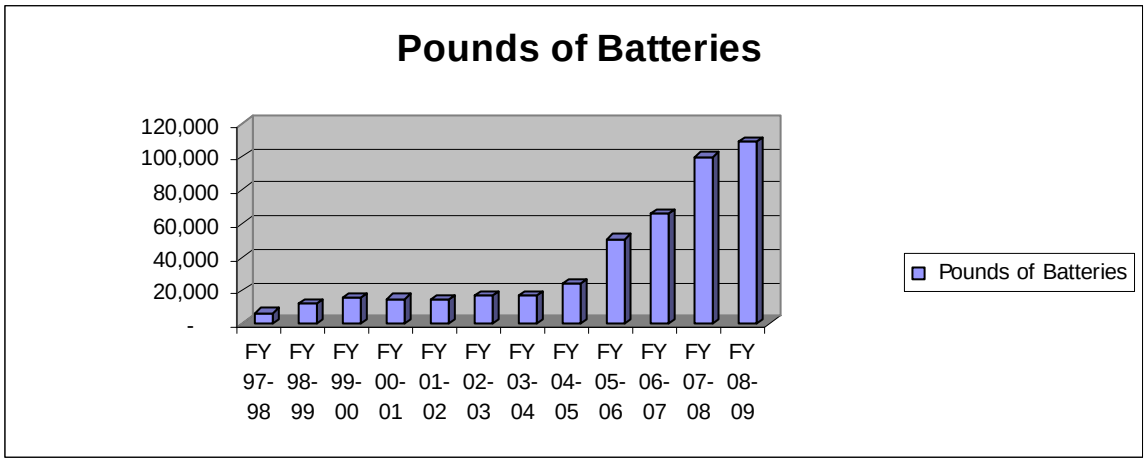
Chart 3



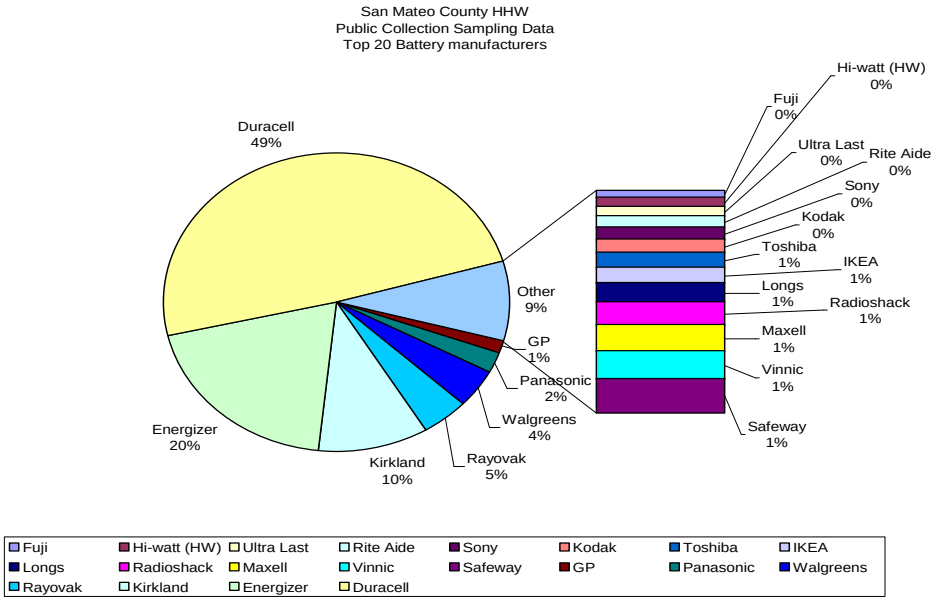
Household Batteries

A similar rise in the volume of household batteries (AAA, AA, 9-volt, and the like) has occurred. In FY 2005, the HHW Program collected 24,000 pounds of batteries. In FY 2009, over 100,000 pounds of batteries were collected. The recycling cost alone was $65,000. An additional $300,000 was spent on public education, collection, sorting and taping. In February 2009, new rules promulgated by the federal DOT to prepare batteries for shipment (taping each battery) raised the spectre of skyrocketing costs. We have studied the labor needed to comply with this new regulation and have calculated that taping 1,100 pounds of batteries required 19 labor hours. Between January and December, 2008, the HHW Program collected over 115,000 pounds of batteries and complying with the DOT regulations takes roughly a minute per pound. This is equivalent to approximately 2,000 labor hours each year (1 FTE). The fully loaded cost of a Hazardous Materials Technician to sort and tape batteries is $42 per hour. This equates to $0.70 per pound.

Chart 4



San Mateo County conducted an analysis by brand of the batteries collected by their HHW Program in 2008. The manufacturers were easily identified and reflect the typical market share of the waste batteries collected by HHW programs throughout the state.



Medical Waste

Medical devices for home use, pharmaceuticals, and even personal care products raise new issues for end-of-life management. These range from the danger of needle sticks by waste haulers to illegal and unsafe drug use by teens, to the entry of persistent organic pollutants into our water systems. Under their standing mission to protect health and safety, managing these wastes now falls to local governments, in addition to products with traditionally-recognized hazards.

Sharps

On September 1, 2008, California Senate Bill 1305 (Figueroa) took effect, making it illegal to place used home-generated sharps in the trash or recycling receptacles. The new law mandates used sharps be placed in approved sharps containers. Once the container is full, it should be brought to an approved drop-off location. The burden of legal disposal is placed on the consumer, rather than the manufacturer or distributor. In communities across California, options for sharps users range from free collection by health care providers, to drop-off at pharmacies or local government facilities, to costly mail-back programs at consumer expense.

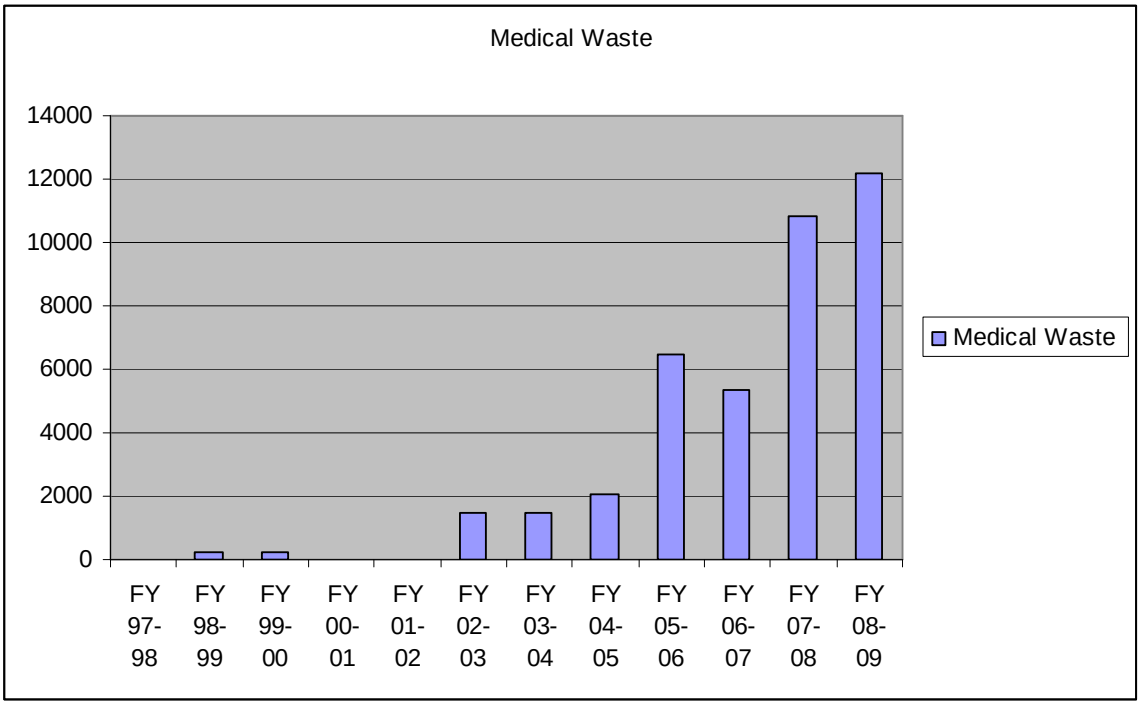
More than three billion sharps are used in the United States each year. It is estimated in Santa Clara County alone, residents generate over 14 million sharps each year. Historically, the Santa Clara County HHW Program collected approximately 2,500 pounds each year which equates to approximately 225,000 (1.5% of sharps generated) sharps. Although the County of Santa Clara's HHW Program has been accepting used home-generated sharps for many years, the Program does not have the resources to provide collection for 1.2 million sharps each month.

Pharmaceuticals

Pharmaceuticals collection and management is complicated by legal and practical issues. HHW staff are not trained in medical waste management; nor can they legally take possession of controlled substances. Controlled substances must be under the control of law enforcement and cannot be accepted by any other party. Additionally, pharmaceuticals come in a variety of solid and liquid forms, in containers normally labeled with sensitive personal information from the consumer. Since no sorting can be done by HHW staff, all containers and their contents are incinerated. In FY 2008, the HHW Program collected over 7,450 pounds of pharmaceuticals at a cost of $5,500.

In British Columbia, Canada, a medications return program has been in place since 1996. British Columbia, with a population of approximately 4.2 million, has over 900 community pharmacies participating in the program. Pharmacies offer a logical and convenient location for the public to return unused or expired medications. This simple but effective EPR program is funded by the pharmaceutical manufacturers (the same companies that operate in the U.S.) and cost $315,000 in 2008 (at a fraction of a percent of operating costs, compared to research and development or marketing).

Chart 5



Emerging Waste Streams

Solar Panels

According to the Silicon Valley Toxics Coalition, in a January 14, 2009 report entitled *Toward a Just and Sustainable Energy Industry*, solar panels contain many of the same hazardous materials found in electronic waste which is banned from landfill. Metals and chemicals such as lead, brominated flame retardants, cadmium, and chromium are contained in solar panels. Ironically, many of these same materials are being phased out of electronics in compliance with European directives. It is just a matter of time before solar panels are banned from landfill. Santa Clara County's HHW Program has already received solar panels cut up into small pieces and delivered to an HHW collection event. Hundreds of millions of dollars are now being distributed by the federal government, through President Obama's Stimulus Plan to encourage the manufacturing and installation of solar panels throughout the nation. Will we wait until a hazardous product becomes a problem at end of life like we did with electronic waste and fluorescent lighting or will we plan for safe disposal as part of the life cycle of the product?

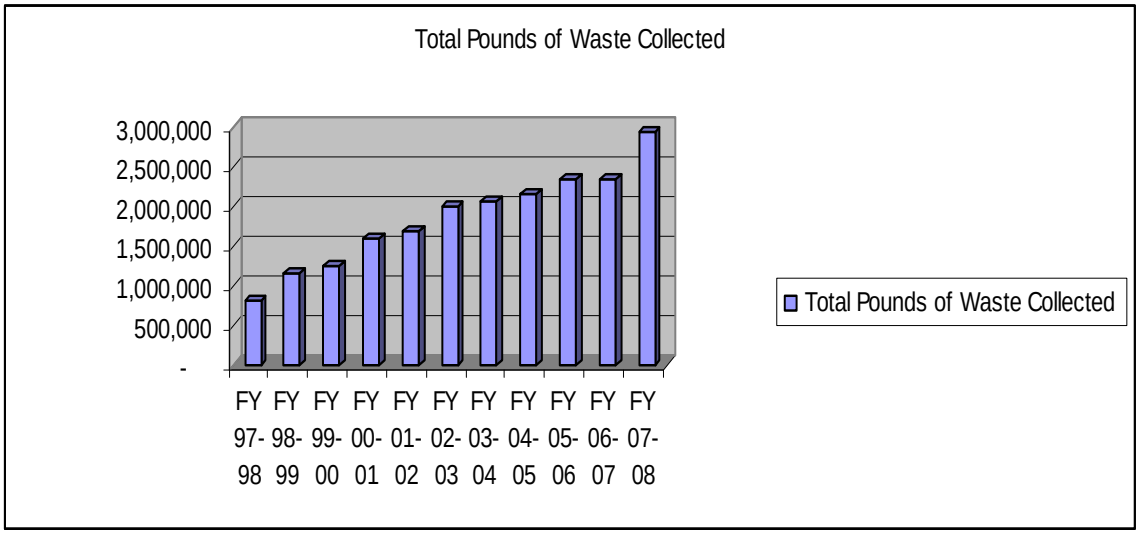
Nanotechnology

In an earlier report by the Silicon Valley Toxics Coalition, entitled *Regulating Emerging Technologies in Silicon Valley and beyond*, nanotechnology is explored as a potential problem technology. Nanotechnology is used in the electronics, medicine, environmental remediation and solar energy fields. These processes and materials pose unknown potential environmental and health hazards. As pointed out in the report, nanotechnology presents a particular risk for inhalation because the basis of this technology is the manipulation of material at the molecular level. As with widely used materials of the past, including DDT, asbestos, benzene, and brominated flame retardants more information is needed about this technology and the potential risks to public health.

BEYOND LOCAL CAPACITIES

As environmental awareness grows and issues such as pharmaceuticals in the water and the ban of many products from landfill become more publicized in the press (the "Al Gore Phenomenon"), the volume of hazardous waste managed by the HHW Program continues to rise. This increased environmental awareness by residents of the County encourages the proper disposal of UW products, like fluorescent lamps and batteries which continue to show the highest disposal growth patterns. Individual product Producer Responsibility laws in California, such as the Mercury Thermostat Collection Act of 2008 (AB 2347), requiring manufacturers to collect and recycle mercury-containing thermostats, provide a small measure of relief. In addition, alternative collection mechanisms such as voluntary Retail Take-it Back Partners are assisting in the collection of UW and sharps and deflecting some costs away from the Santa Clara County HHW Program.

Chart 6

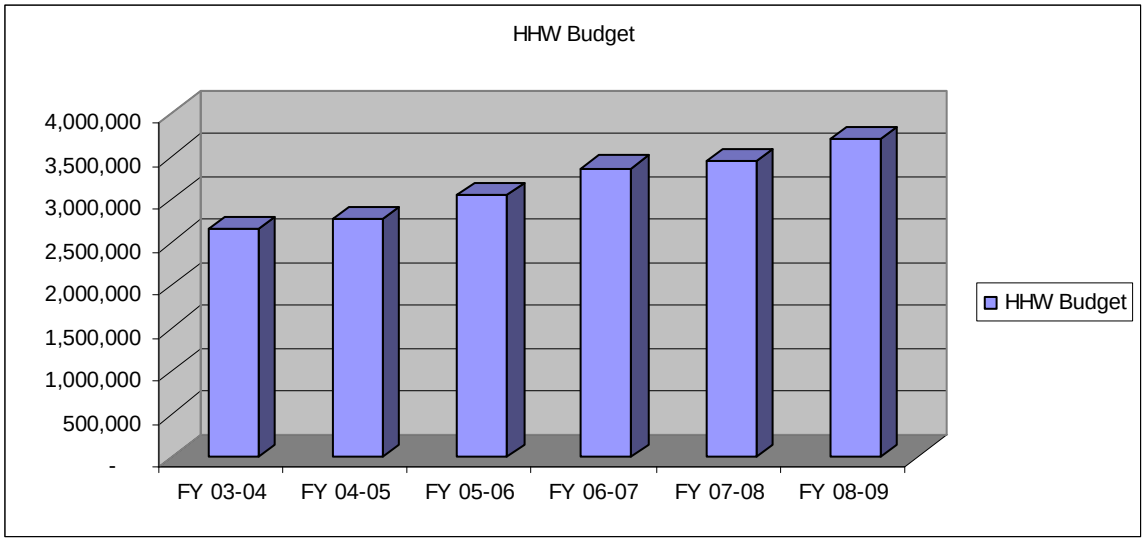


Local government infrastructure, with centralized collection points staffed by government workers and isolated from the places where consumers conduct everyday business (home, work, shopping, recreation), are not designed for the convenience needed for high participation rates. Nor are they large enough to safely store and separate the vast array of products and packaging on the market. The notion that government service can simply be increased, like placing a larger bucket at the end of the same pipe, ignores fundamental differences between government operations and the flexibility and innovation possible in private-sector run systems.

INCREASED COSTS

As a result of increased hazardous waste volumes, cost to manage the waste has increased as well. Santa Clara County and all of its cities fund the HHW Program through a solid waste tipping fee (AB 939 Implementation Fee) assessed on each ton of residential and commercial waste disposed at landfill The AB 939 Implementation Fee has increased (see Table 1); but it still does not allow for higher service levels.

Chart 7



The AB 939 Implementation Fee displayed below was designed to support resident participation from 3% of households in each jurisdiction. Historically, this level of funding has been inadequate to deliver services to residents demanding service. Each city has had to augment their funding using other funding mechanisms to satisfy their residents. The AB 939 Implementation Fee has been increased to $2.60 per ton for Fiscal Year 2009/2010 to aid the cities in funding increased demand. Unfortunately, even this increase will not meet demand in most of the cities. As a result, most cities must augment the Fee, with general funds or other sources, to satisfy resident demand. Budget concerns place local governments in the tenuous position of needing to educate the public about proper disposal, but not being able to afford too much success in the form of improved participation.

Table 1

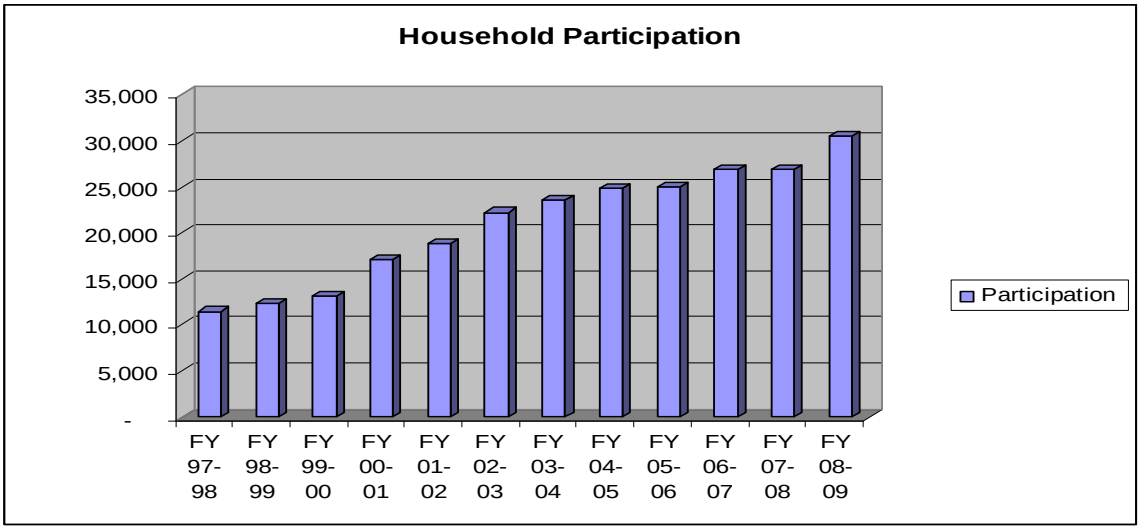
Fiscal Year	AB939 Fee	Augmentation Provided by Cities & County	Non Competitive Grant Fund	Competitive Grant Fund	Total Cost	AB 939 Fee Per Ton
FY 03-04	1,772,480	386,154	389,755	108,470	2,656,860	$1.85
FY 04-05	1,751,114	409,873	412,441	199,596	2,773,024	$1.85
FY 05-06	1,883,517	446,744	481,671	230,441	3,042,373	$1.85
FY 06-07	2,161,138	576,819	488,615	136,857	3,363,430	$2.22
FY 07-08	2,214,534	641,812	526,757	62,423	3,445,526	$2.05
FY 08-09	2,219,466	775,692	564,140	140,698	3,699,996	$2.05

INCREASING PARTICIPATION

Since the Program inception in 1992, participation has gradually grown. The marketing of products that contain hazardous components grow faster than local governments ability to

manage them at end of life. The state continues to ban products from landfill, further burdening local government. Below is a chart of participation growth.

Chart 8



LOCAL STAKEHOLDERS: HHW PARTNERS

HHW Programs are now the default collection mechanism for environmental contaminants identified by many agencies as pollutants of concern (notably, mercury, pesticides, and pharmaceuticals). Water, water treatment, stormwater and solid waste agencies share a common interest in keeping toxics out of the environment. Since they cannot block or treat most chemicals entering the water systems through improper disposal, these agencies promote public use of existing HHW programs

Waste Water Treatment Plants

The four publicly owned treatment works (POTW) in Santa Clara County are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit to demonstrate to the Federal government and the State Water Resources Control Board their plans to minimize the discharge of pollutants from sewer systems to water bodies of the State, including the San Francisco and Monterey Bays. The San Jose/Santa Clara, Sunnyvale and Palo Alto POTWs discharge to the San Francisco Bay and the Gilroy POTW discharges to the Monterey Bay.

All POTWs are required to minimize the discharge of pollutants of concern listed on the Federal 303(d) list. The 303(d) list monitors threshold levels of pollutants that may have detrimental effects on water quality and human health. Mercury and pesticides are pollutants of concern listed on the 303(d) list and as a result, all POTWs are required to develop pollution prevention plans to minimize impacts to the Bay. In addition, local POTWs maintain a watch list of potential pollutants not yet listed on the 303(d) list. The current pollutant being considered for the watch list is pharmaceuticals which enters the POTWs through the residential sewer system.

Financing of these programs comes from the respective tributary cities. Individual financing mechanisms vary. For the San Jose/Santa Clara Water Pollution Control Plant (WPCP) , the primary source of funding comes from fees paid through tax-based assessments within the residential,

commercial, and industrial sectors. Funding is also generated through monthly user fees, and one-time development fees paid by individuals or organizations needing the WPCP's services.

Stormwater Management Agencies

All cities within the County are required to obtain a NPDES permit to manage stormwater that drains to the Bay, passing untreated from streets, lawns and parking lots through the watershed's creeks. The thirteen cities in the northern part of Santa Clara County and the County, representing the unincorporated areas, are co-permittees to one NPDES permit. The fourteen jurisdictions fund and cooperate through the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPP). The County and the cities of Gilroy and Morgan Hill are co-permittees to a separate permit. Co-permittees are required to develop and implement pollution prevention plans to manage pollutants of concern on the 303(d) list, including litter (products and packaging), mercury, pesticides, and a wide range of common household chemicals.

The US EPA has listed all sections of the San Francisco Bay and Santa Clara County's Guadalupe River Watershed as impaired due to mercury pollution. When mercury is introduced anywhere in the environment, it has the potential to volatilize and be deposited elsewhere. Because of mercury's bioaccumulation and movement patterns in the environment, the reduction of any amount of mercury is important. Recycling and disposal of mercury in consumer products can have a significant impact on reducing mercury levels in the environment.

Stormwater fees are used to improve the quality of a city's storm and surface water runoff and to meet the costs of increasing federal, state, and regional regulatory requirements. These fees support pollution control, system maintenance and operations, storm sewer improvements, and administrative services. Each NPDES co-permitee city finances their portion of the stormwater program differently. For example, in one city the fee appears on each property owner's property tax bill while other cities fund storm water program activities directly from their general fund.

Role of HHW Programs

The Santa Clara County HHW program provides an essential service in support of the POTW's and Stormwater administration of the regions NPDES permits by providing the only legal means of disposal for residents to dispose of household toxics that might otherwise end up dumped into the storm sewer system or down the drain.

POTWs and Stormwater agencies are conducting education campaigns to discourage residents from disposing of mercury containing products, pesticides and pharmaceuticals down the drain, recommending disposal through the local HHW Programs as the preferred alternative. As a result of increased public education and the Al Gore Phenomenon, participation by residents continues to increase at HHW collection facilities, waste volumes continue to grow and costs continue to rise. At this time, no funding from the POTWs or stormwater programs is provided to the HHW program.

TRANSITIONING TO EPR

Expand Local Government Collection Infrastructure?

The least preferable way for local government to deal with the onslaught of hazardous waste products is to build infrastructure and raise rates and taxes. As displayed above, the Santa Clara

County HHW Program is funded by an AB 939 Implementation Fee. The fee is designed to provide a minimum level of service to 4% of households in each jurisdiction. Currently 4.9% of households in the County use the HHW program at a cost of approximately $3.7 million. If the Countywide program was to actually collect and manage 100% of the banned waste, the Program could cost as much as $60 million. Clearly this would be an unattainable level of funding in today's economic and political climate and could cost hundreds of millions of dollars statewide.

Even if sufficient funding were available, HHW programs aren't capable of providing the convenience needed for full consumer participation, or the efficiency of a producer's reverse distribution systems.

Retail Take-it-Back for Fluorescent Lamps and Batteries:

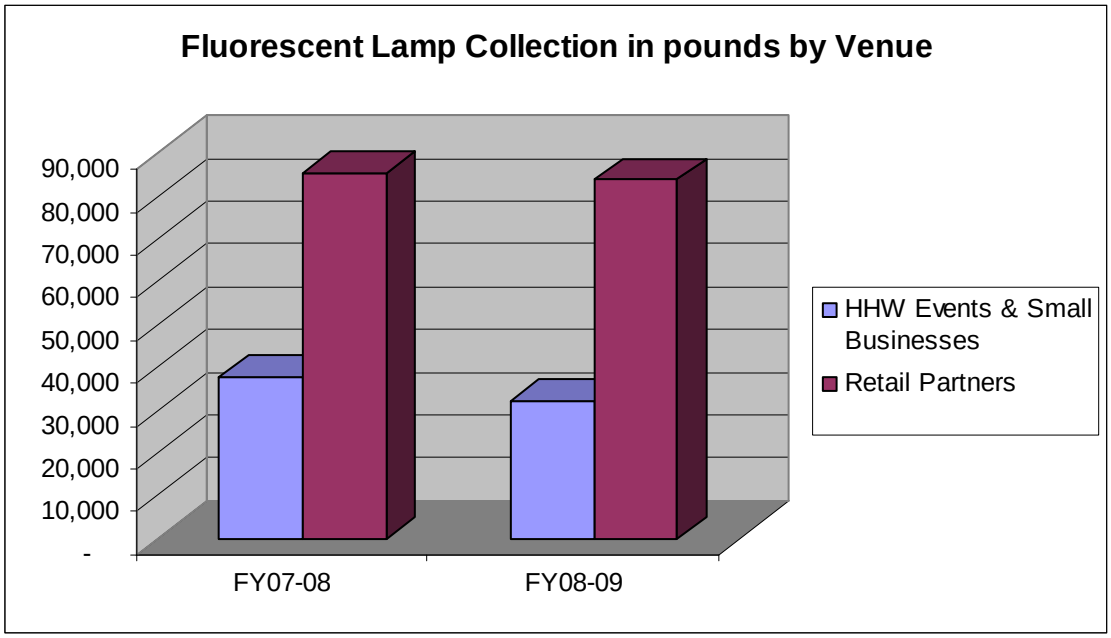
Baby Steps Toward Producer Responsibility

Since February 2006, Californians are prohibited from placing fluorescent lamps and household batteries in the garbage. To provide Santa Clara County residents with convenient opportunities to properly dispose of these wastes, the Santa Clara County, HHW Program created the Retail-Take-it-Back Partner Program. This program establishes partnerships with local retailers to serve as collection points for used batteries and fluorescents lamps. Retailers work in cooperation with the HHW program by becoming a collection point for residents to drop-off lamps and batteries. The HHW program picks up the waste and transports it to a HHW facility for final shipment to a recycler.

The HHW Program provides Retail Take-it-Back Partners with supplies and materials to collect these wastes from the community and pays for the recycling. The supplies consist of fluorescent lamp recycling boxes and 5 gallon buckets for battery collection. The Program also provides posters for in-store program advertising, and partners are listed on the HHW website (www.hhw.org) and in public education material. Each partner is provided with instructions on cleaning up bulb breakage, a list of guidelines and responsibilities, and general information on UW to assist them in the collection process. In addition, the County ran ads in local newspapers and funded various television spots, thanking these participating retailers and educating residents about safe and proper disposal.

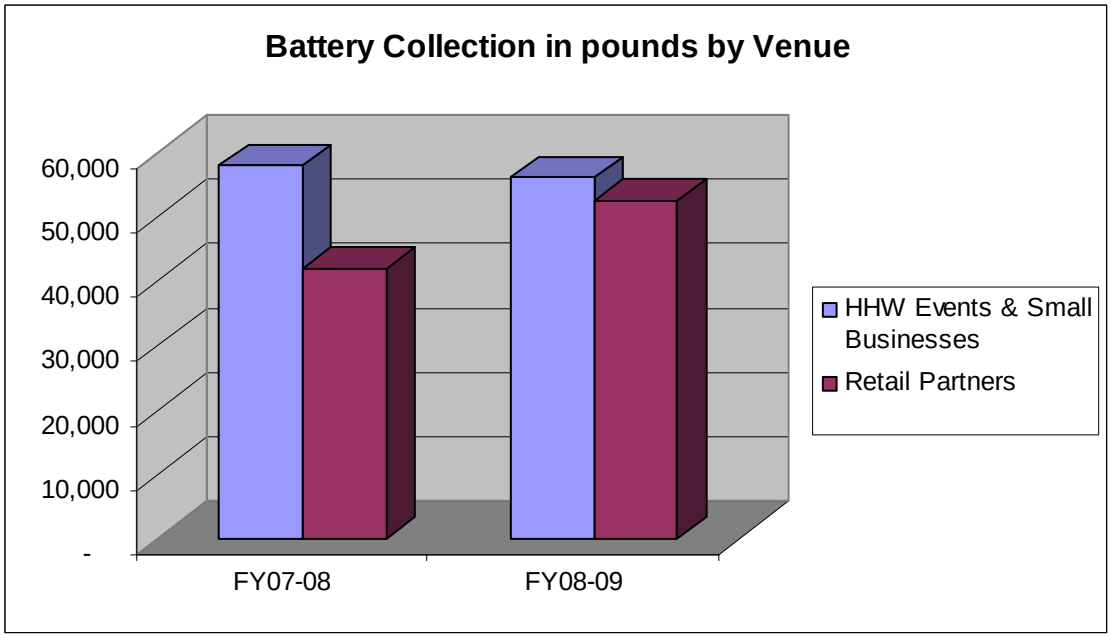
Currently, 66 retailers are participating in the collection of batteries and 32 retailers are collecting fluorescent lamps. Hopefully, in the future, the cost of managing these wastes will be shifted away from local government and taxpayers and placed on the manufacturers where the cost of recycling can be included in the price of the product.

Chart 9



As the chart above illustrates, convenience is the key to consumer participation. Since the creation of Retail Take-It-Back Partners, about 70% of fluorescent lamps managed by the County are brought to the retailer. This new convenient drop-off service affords residents simple and easy recycling opportunities. Residents prefer to take their lamps back to the place they bought them.

Chart 10



About 50% of the batteries managed by the HHW Program are collected by the Retail Take-it-Back Partners. Even with a small, non-breakable item, residents prefer the convenience of the 'drop-while-you-shop' option.

Due to the high cost and labor required to manage batteries, some local jurisdictions are considering the discontinuance of residential battery collection. While this is an option for local government HHW programs, this kind of a reversal of services could prove politically unpalatable.

An Attempted Transition to EPR

The Santa Clara Clara County HHW Program attempted to shift the financial responsibility of battery and fluorescent recycling to the retailers participating in our program. When Home Depot announced their program to accept compact fluorescent bulbs (operating collection and disposal at their own cost), the County HHW Program saw this as an opportunity to require the same of the other retailers. Almost all retailers threatened to stop accepting bulbs if the County withdrew funding. Only Orchard Supply Hardware agreed to assume the cost for recycling but insisted that there acceptance of bulbs be unpublicized. In the absence of a local ordinance mandating retailer participation we could not withdraw funding. Each retailer remains listed on our website and listed on educational materials.

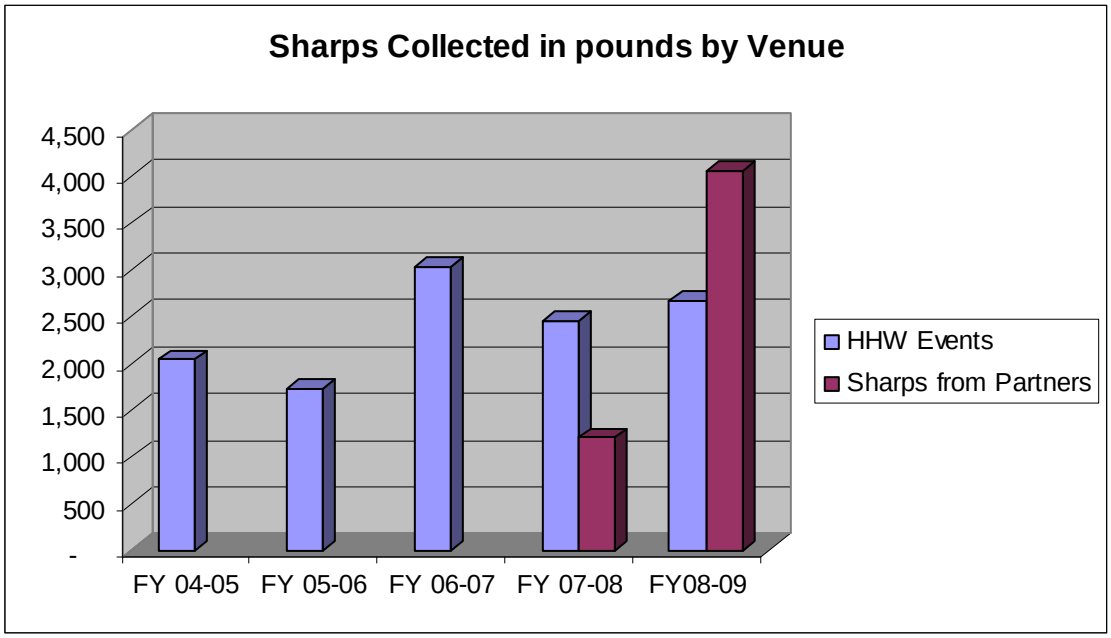
Retail Take-it-Back for Sharps at Pharmacies

Prior to the September, 2008 ban on sharps in the waste stream, the HHW Program recognized the need for more convenient drop-off locations and began recruiting local pharmacies, medical clinics, and veterinarian clinics, to become Retail Take-it-Back Partners for used home-generated sharps. The goals of the Retail-Take-it-Back Program are to encourage proper disposal, develop convenient drop-off locations, and shift the collection and disposal of sharps waste from local government to producers or distributors of the product. Pharmacies may have leverage with producers to create cost-sharing.

In establishing the Retail Take-it-Back Partners, the HHW Program contacted pharmacies, veterinarian clinics, and medical centers, asking if they would partner with the County and become a consolidation point for used-home generated sharps. As incentives to participate, the HHW Program provided partners with a steel receptacle in which residents would directly deposit their used sharps, a limited quantity of quart size biohazard sharps containers for distribution, and advertising opportunities for their business. Partners would be listed on the HHW website and in the drop-off location cards that are placed in our trilingual (English, Spanish, and Vietnamese) sharps brochures. The HHW program also helped with the set up process by providing them with a list of medical waste haulers, a safety guideline for sharps collection, and signage. In addition the County ran ads in local newspapers thanking these participating businesses and educating residents about safe and proper disposal.

Currently 17 pharmacies are participating in the program and provide a valued service to their customers. Each pharmacy recognizes the need for drop-off locations in their community. These Retail-Take-it-Back Partners have made it more convenient for County residents to properly dispose of their used sharps and help reduce the financial burden of managing this waste stream for the County and all cities participating in the HHW Program. The new pharmacy partnerships will double the collection volume for FY 2009.

Chart 11



Sharps collection in FY 2008/09 is expected to double and almost all of that increase was collected at our private Retail Take-it-Back Partners. As cited earlier in the British Columbia model, an industry funded and implemented collection program would provide a higher level of convenience to better serve the needs of the community

ROLE SHIFTS IN

EXTENDED PRODUCER RESPONSIBILITY (EPR) SYSTEMS

The Organization for Economic Cooperation and Development defines EPR as an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle. There are two key features of EPR policy: (1) the shifting of responsibility (physically and/or economically, fully or partially) upstream to the producer and away from municipalities, and (2) to provide incentives to producers to take environmental considerations into the design of the product.

When the roles of government, producers, retailers, recyclers and reverse distributors, and consumers are properly assigned under an EPR system, both the economy and the environment improve. Existing inefficiencies are removed, and the system financially rewards behavior that conserves resources and prevents pollution.

Wasting Government Resources

EPR is a paradigm shift in how we think about material flows. Generating "waste" implies a misuse of resources; and local government management of waste squanders taxpayer money. Local governments, historically responsible for protecting public health and managing waste, react to the flow of material at the end of the pipe and have no control or say over the production process to minimize waste. More importantly, local governments are not part of the manufacturing process to reuse these materials. Manufacturers are best suited to reuse these materials in their processes. Local government waste management is inefficient and should be

turned over to manufacturers. This shift in the physical management of materials can lead to more efficient material usage, reduced degradation to the natural world from resource extraction, the creation of green jobs and conservation of energy, particularly fossil fuels. Recycling, reuse, deconstruction, and remanufacturing shift the value added in the economy from highly mechanized, environmentally harmful extraction industries, to labor-intensive, local industries[2]. EPR can also incent better product design for reuse, increased recycled content and design and recyclability.

Producers as Designers of Cradle-to-Cradle Systems

EPR programs can be best understood as a change in the traditional balance of responsibilities between the producers of consumer goods and local governments with regard to waste management. Although they take many forms, these programs are all characterized by the involvement of producers, sometimes through other members of the supply chain (retailers or distributors) in the return and sound management of consumer products at the post-consumer stage. EPR extends the traditional environmental responsibilities that producers have previously been assigned (i.e. worker safety, prevention and treatment of environmental releases from production, and financial and legal responsibility for the sound management of production wastes) to include management of products at the post-consumer stage.

Shifting the financial responsibility can incent manufacturers to reduce the generation of waste and design convenient and efficient system for the collection of waste. Financial responsibility can also drive economically sound recycling systems and reduce the toxicity of products on the market. These efficiencies can only be achieved when the experts of production use the same innovation and ingenuity to recycle materials that they use to produce the product. Local government waste management systems are simply a subsidy to industry. Government's limited resources should instead be invested in what they do best - regulate and oversee the market-based systems to protect the environment and public health.

Public Benefits

A properly designed EPR policy can be a driving force for waste avoidance and associated pollution reduction throughout many sectors of the economy. EPR can improve recycling rates reducing litter, particularly ocean litter as studied by the Ocean Protection Council. Further benefits could include:

- reducing the number of landfills and incinerators and their accompanying environmental impacts;
- reducing the burden on local government for the physical and/or financial requirements of waste collection and management;
- fostering recycling and reuse of products or parts thereof;
- improving the ease and timeliness of disassembling products for recycling or reuse;
- reducing or eliminating potentially hazardous chemicals in products;

[2] Opportunities to Reduce Greenhouse Gas Emissions Through Materials and Land Management Practices, U.S.EPA Office of Solid Waste and Emergency Response, September 2009

- promoting cleaner production and products;
- promoting more efficient use of natural resources;
- improving relations between communities and firms;
- encouraging more efficient and competitive manufacturing;
- promoting more integrated management of the environment by placing an emphasis on the product's life cycle;
- improving materials management." [3]

LOCAL GOVERNMENTS AS CATALYSTS

Local governments until recently have been quiet in the U.S and California about the deluge of hazardous products they must manage in order to comply with state landfill bans. Historically, they act as agents of higher levels of government, and provide direct services to their resident communities. The growing waste crisis, however, has inspired many to move into the policy-making arena, raising their voices individually and collectively to advocate for meaningful and constructive change.

With a heavy stake in the game, local governments seek a seat at the table while new systems are designed. And they are taking a range of actions to bring producers to the table to cooperate in the creating of a level legal playing field overseen by State and Federal agencies.

Strategies for Consideration

1. Adopt Local Ordinances

New York City will be a proving ground for a local ordinance mandating take-back by the producers . In this case, the electronic manufacturers (producers) are responsible for the development of a system to take-back their products from the consumer. The new ordinance has been challenged by the Consumers Electronics Association and the Information Technology Industry Council, both electronic manufacturer groups. This case speaks to the heart of EPR and the ability of local governments to regulate the behavior of global producers who may indirectly sell products in the City.

Only one local jurisdiction in California, the San Luis Obispo Integrated Waste Management Authority, has imposed a local ordinance mandating take-back by a retailer who sells a certain product. The local ordinances require that retailers take-back and manage the end of life disposition of sharps, fluorescent lamps, paint and batteries.

Whether local ordinances of these types are upheld by the courts will take some years to resolve at a national level. In both the short and the long run, manufacturer resources are better invested in designing EPR systems appropriate to their specific product lines than in fighting a host of lawsuits in District courts. Should the local governments prevail, producers will also bear the expense of compliance with a patchwork of regulations across their markets.

[3] Environment Canada, http://www.ec.gc.ca/epr/en/epr.cfm

2. Collective Jurisdiction Lawsuit

Collectively, all jurisdictions in California have the option to sue manufacturers doing business in the state for the proliferation of hazardous products in the waste stream. Manufacturers knowingly sell products that at the end of life are hazardous and toxic and banned from landfill. Each jurisdiction, in an effort to protect public health and the environment, spends millions of dollars collecting and disposing of these products. The liability for the pollution resulting from hazardous products may be seen as a strict liability issue for manufacturers.

3. Litigate to require State Action

Each jurisdiction in the state can join together to sue the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) for failure to regulate toxic products through their authority to mandate take-back programs. DTSC has found and banned from landfill many products determined by the state to be toxic at the end of its useful life. DTSC has authority under Health and Safety code Section 25253(b)(7)to require a manufacturer whose product is hazardous at end of life and banned from the landfill to implement a take-back system to collect and dispose of or recycle their products.

Mercury in particular is a neurotoxin and a component of fluorescent lamps. It is also a pollutant identified on the 303(d) list of contaminants. The release and accumulation of mercury is known to endanger public health and welfare. Increased mercury is known to bioaccumulate in fish and warnings to the general public and in particular, pregnant woman and nursing mothers are cautioned at limiting their diet of certain fish. In addition, mercury is a contaminant in drinking water and due to climate change, California's water resources are expected to continue to be strained and the contamination of water resources by mercury threatens an already imperiled resource.

Since 2008, DTSC has had authority to require that manufacturers selling fluorescent lamps in the state implement a system to safely collect fluorescent lamps and manage the mercury. DTSC has the authority to mandate the proper management of fluorescent lighting by manufacturers and has failed to do so. Local jurisdictions could band together to demand action on DTSC's part to protect the environment and public health and reduce the financial burden on local governments who have taken action by collecting and managing hazardous waste through local household hazardous waste programs.

4. Environmentally Preferable Purchasing

Local and state governments are large volume consumers and can use their purchasing power to drive markets toward better design, increased recycled content, reduced packaging and vendor take-back of obsolete and unwanted hazardous products for responsible recycling. Purchasing departments can include Extended Producer Responsibility in the purchasing specifications of a product which can save local government the time it takes to manage the waste at end of life and the money required to dispose of it legally.

A variety of jurisdictions are taking this approach, and learning from one another the most efficient and effective ways to implement new specifications. In some cases, such as the adoption of EPEAT standards for electronics, changes in product design are already being seen.

Hierarchy of Preferred Producer Responsibility Purchasing Strategies[1]

Best. Buy directly from manufacturers (typically the brand owners) who offer collection and recycling systems that they operate or finance. This gives the greatest incentive for producers to redesign their goods for recyclability. Example: Dell offers Asset Recovery and Recycling Services that include equipment collection, data destruction, and equipments donation and recycling.

Better. Buy from vendors who participate in a manufacturer-financed third-party recycling program. Example: the Rechargeable Battery Recycling Corporation's (RBRC) Call2Recycle Program.

Good. Buy from vendors who collect and recycle products and packaging when new items are delivered or when old items reach the end of their useful life. While sending products back up the supply chain will create an infrastructure for recycling, it may not offer incentives for manufacturers to redesign their products.

* Product Policy Institute

5. Join and Support the California Product Stewardship Council

The California Product Stewardship Council (CPSC) is the only statewide organization speaking for local government HHW programs. Incorporated in July 2007, CPSC was created by like-minded local government staff, who recognize the current model of waste management as unsustainable. Already a powerful voice educating elected officials, businesses, and the public, dozens of cities and counties, waste haulers, special districts handling solid waste and water services, and even producers participate. Allies include a variety of non-profits with similar interests, retailers, and a few industry groups. Membership provides valuable opportunities for outreach and education assistance, information sharing with local governments throughout the state, and keeping up with the ever-changing legislative arena of EPR.

The mission of CPSC is simple:

To shift California's product waste management system from one focused on government funded and ratepayer financed waste diversion to one that relies on producer responsibility in order to reduce public costs and drive improvements in product design that promote environmental sustainability.[4]

On February 28, 2007, the Santa Clara County Recycling and Waste Reduction Commission (RWRC) voted to support the CPSC and forward a recommendation to the Board of Supervisors

[4] CPSC Mission, http://www.calpsc.org/index.html, 2009

to encourage their support. On May 22, 2007, the Board of Supervisors voted to support Extended Producer Responsibility and made it part of the Board's Legislative Policies and Priorities. Since then, the Technical Advisory Committee, staff to the RWRC, assigned Rob D'Arcy to act as liaison for the County to CPSC.

Visit www.CalPSC.org or call (916) 480-9010.

CONCLUSIONS

The implementation of EPR can take many forms. As outlined above, EPR can range from partnerships with local retail businesses to engaging manufacturers in the courts. Whatever the route, local government will find itself bigger and more expensive to taxpayers if a shift in responsibility is delayed. Without a change in responsibility, the wrong signals continue to be sent to manufacturers and markets will continue to use up our limited resources. The business community and our political process has come to accept externalities like pollution and hazardous materials as though commerce would cease without it. Externalities are avoidable if the incentives for cleaner production are in the right place. EPR promotes greener design and can help decrease the squandering of natural resources. EPR removes inefficient government involvement from the free market by putting industry in charge of recycling and the reuse of those materials. The absence of EPR forces local governments to raise taxes and rates and build a massive waste management public infrastructure to operate recycling material flow. This control belongs in the private sector and the sooner we shift that responsibility to industry the sooner we can expect smaller government and lower taxes.

White Paper

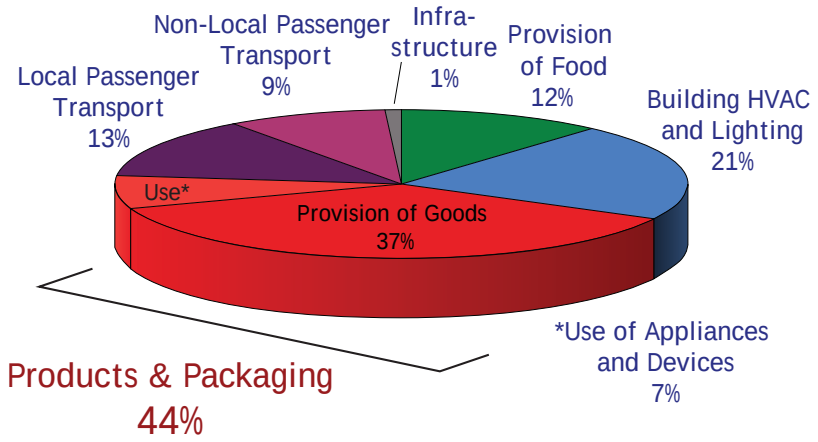
Products, Packaging and US Greenhouse Gas Emissions

*by Joshuah Stolaroff - PhD**

September 2009

Executive Summary

This paper builds on a new report from the U.S. Environmental Protection Agency, "Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices," which offers new insight into the impact of products and packaging on climate change. Based on the report, non-food products are associated with 37 percent of U.S. greenhouse gas emissions. **This paper extends the EPA analysis to include the impacts from producing products abroad that are consumed in the U.S. This brings the share of products and packaging to 44 percent of total U.S. greenhouse gas emissions.**



U.S. Greenhouse Gas Emissions: Systems-based view
including emissions embodied in international trade.
(Provision of Goods: all consumer goods including building components and vehicles.)

A comparison with these national-level figures is made with previous research on U.S. household carbon footprints, which similarly finds that products make up a large share of the average household's greenhouse gas impact and a significantly larger share when international emissions are included. Examples are given of how state and local governments can measure and reduce emissions associated with products. Extended Producer Responsibility is discussed as a policy option to reduce the greenhouse gas impact of products.

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Disclaimer: *This paper has not been reviewed by EPA. The views expressed in this document are solely those of the author and do not necessarily reflect those of the Agency.*

Products and packaging are responsible for a large share of greenhouse gas emissions in the United States.

Products and packaging are an essential part of daily life for North Americans. Along with food, shelter, and transportation, products are the spoils of an industrial economy that fulfill the needs and wants of modern consumers. However, in its current structure, this economy has many environmental impacts, including a growing and dangerous influence on the Earth's climate.

Transportation, buildings, and, increasingly, food production, are known to contribute to global climate change. But products are an often-overlooked driver of global emissions.

The typical lens through which to view greenhouse gas emissions is through the economic sectors in which they are released. By allocating emissions according to economic sectors, we find the vast majority of greenhouse gas emissions occur in the electric power, transportation, and industrial sectors (34, 28, and 19 percent of emissions, respectively).[1] This view suggests that these three sectors are the most important to control in order to reduce overall emissions and address climate change.

Considering only emissions that are released within U.S. borders, the total share of U.S. greenhouse gas emissions associated with products and packaging is 37 percent.

Products do not play an obvious role in this picture. Most products do not emit greenhouse gas directly. The notable exceptions are appliances that run on natural gas and paper products, which emit methane as they decompose in landfills, but neither of these comprises a large share of total greenhouse gas emissions. On the other hand, if we view the impacts of products more completely, across the life cycle of extracting raw materials, processing, manufacturing, transporting, using, and disposing of products, a different picture emerges.

The U.S. EPA recently released a report, "Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices."[2] Instead of sectors, this report allocates U.S. greenhouse gas emissions to "systems" (see Figure 1). According to the report, "each system represents and comprises multiple parts of the economy that work together to fulfill a particular need." This systems view is "helpful for framing opportunities to reduce greenhouse gas emissions through prevention-oriented mitigation strategies that act across an entire system."

What the report calls "prevention-oriented mitigation strategies" include many of the strategies that can reduce the impact of products, like green design, waste prevention, and recycling. EPA's systems view is useful, then, for understanding the impacts of products and means of reducing those impacts.

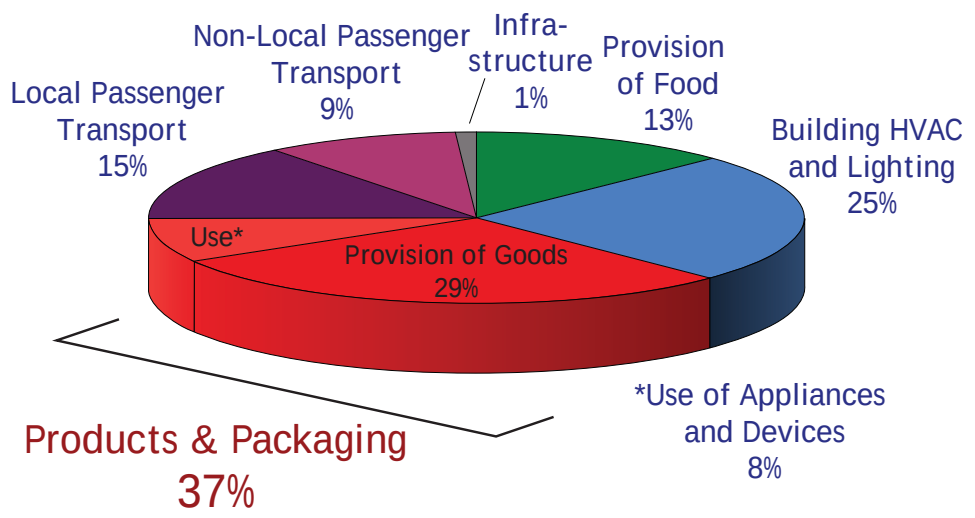

Figure 1: U.S. Greenhouse Gas Emissions: Systems-based view.
Source: U.S. EPA, 2009.

(Provision of Goods: all consumer goods including building components and vehicles.)

The "Provision of Goods" system in Figure 1 is similar to what we consider the impact of products and packaging in the full life cycle sense, except for the use phase of the life cycle. It includes emissions from extracting raw materials, processing materials, manufacturing, transporting, and disposing of non-food goods, and accounts for 29 percent of U.S. greenhouse gas emissions. The goods in this system include all non-food products, all packaging (including for food), vehicles, and materials for buildings and construction (except for heavy infrastructure).

Emissions associated with vehicle manufacturing and building construction (including manufacturing of furnaces, hot water heaters, and air conditioners) cannot be separated from other products in the EPA data, so the Provision of Goods slice represents products in a very broad sense.

The use phases of products are split among various other slices in Figure 1. Aside from vehicles and buildings, the use phases of most products are included under "Use of Appliances and Devices." This system accounts for 9 percent of U.S. greenhouse gas emissions. Combining Use of Appliances and Devices with Provision of Goods, that is, combining the use phase with other phases of the product life cycle, gives us one picture of the impact of products and packaging. Considering only emissions that are released within U.S. borders, the total share of U.S. greenhouse gas emissions associated with products and packaging is 37 percent.

Based on EPA's formulation, the products represented in Use of Appliances and Devices represents a narrower set of products than what is represented in Provision of Goods. Depending on how broadly one defines products, the

combined estimate for the GHG impact of products either under-counts the impact of the use phase (because it excludes the use phase of air conditioners and cars, for instance), or an overestimate of the impact of the the production phases (because it includes those goods). Although 37 percent should not be considered a precise figure, we feel it is the best picture of the impacts of products and packaging available from the EPA data.

Products and packaging account for an even larger share of emissions when products imported for consumption in the U.S. are included.

When one includes emissions from producing goods imported into and consumed in the U.S., products and packaging account for 44 percent of greenhouse gas emissions.

The EPA report referenced above includes only direct emissions in the U. S. However, a great deal of the products consumed here are produced elsewhere. The environmental impacts, including greenhouse gas emissions, from producing those products originate in other countries. Emissions that occur elsewhere but are driven by local consumption are referred to as "indirect" emissions. In the context of U.S. national greenhouse gas impacts, the indirect emissions are international.

Many approaches for reducing greenhouse gas emissions, for example a cap-and-trade system or renewable electricity standard, act on direct emissions. Implementing these approaches requires knowing where the emissions are physically released. In these cases, only domestic emissions can be addressed. The sectors view is useful in these cases because it tells you the share of emissions coming from a particular type of facility, like electric power plants.

Other approaches reduce emissions by changing the ways we produce, consume, and dispose of products and packaging. Manufacturers may improve their design or production process to reduce greenhouse gas impacts. Recycling systems can be improved. Or consumers may choose to buy more sustainable products. All of these changes can reduce emissions in other countries. In these cases, it makes sense to consider the life cycle emissions of products, including international emissions. EPA's report, though it goes a long way to connecting these approaches to climate change by presenting the systems view, does not attempt to quantify the international impacts.

In the paper "Embodied environmental emissions in U.S. international trade, 1997-2004," Weber and Matthews estimate that the carbon dioxide emissions from producing goods imported and consumed in the U.S. were equivalent to 13-30 percent of U.S. direct emissions in 2004.[3] Using output from the same model of emissions associated with international trade used in that paper,[4] we can break out the emissions associated with imported goods into the various systems in Figure 1. **Figure 2** shows a version of the systems

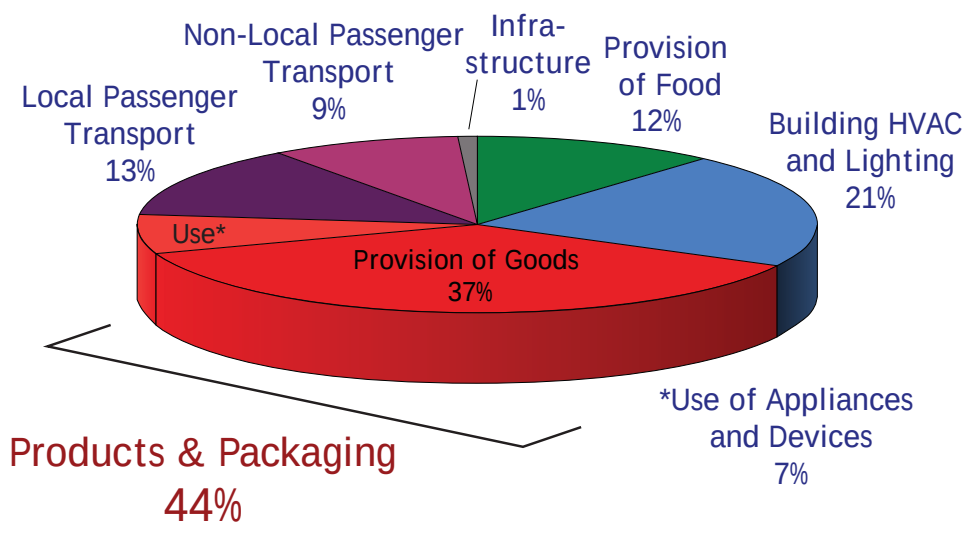

Figure 2: U.S. Greenhouse Gas Emissions: Systems-based view ***including emissions embodied in international trade.***

(Provision of Goods: all consumer goods including building components and vehicles.)

allocation of greenhouse gas that accounts for international trade. We can call this a consumption-based accounting of U.S. emissions, because it represents emissions from goods and services used and consumed in the U.S. (emissions from producing goods domestically that are consumed in other countries are subtracted).

From the consumption perspective, the U.S. greenhouse gas emissions pie is 12 percent bigger than the direct emission perspective in Figure 1. Also, products make up a larger share of this larger total. When one includes emissions from producing goods imported into and consumed in the U.S., products and packaging account for 44 percent of greenhouse gas emissions.

Previous research on household carbon footprints shows similar results.

The EPA report allocates greenhouse gas emissions at a national level. A similar accounting can be done at the state, local, or household level. Another recent study by Weber and Matthews assesses household carbon footprints using surveys of consumer expenditures.[5] Using data from that study,[6] we can show the shares of greenhouse gas emissions of various categories of consumption for the average U.S. household (see **Table 1**). By examining the components of each of Weber's and Matthews' consumption categories, we determined which categories best represent products and packaging. Grouping those categories together, we find that products and services account for 23 percent of the household carbon footprint when only U.S. direct emissions are considered.

Table 1: Average U.S. household carbon footprint by consumption category, **including international emissions embodied in imported goods.** Categories that best represent products and packaging are grouped to show total impact. Source: Weber and Matthews, 2008 and Weber, 2009.

Consumption Category	Total [tons CO_2/ household]	% Total
Food/Beverages	6.7	15%
Transportation	6.5	14%
Housing and Utilities	12.9	28%
Health	4.6	10%
Furnishings, Equipment, Maintenance	2.1	5%
Recreation and Culture	1.7	4%
Miscellaneous Goods/Services	7.6	17%
Clothing/Footwear	2.5	5%
Communications	0.7	1%
Education	0.6	1%
Total	**45.9**	**100%**

Products & Services Combined 33%

By adding the international impacts of imports ... the share associated with products and services increases to 33 percent.

The value is not directly comparable to EPA's Provision of Goods slice discussed above for several reasons. The goods in EPA's slice include some products that are accounted for elsewhere in the household consumption categories, such as building materials and vehicles. The 23 percent value does not include energy used by appliances and devices, which is not separated from other building energy use in the household categories. Finally, the household consumption analysis does not account for government spending, which would shift the category shares. Overall, the systems view discussed above is most useful for framing broad government polices. The household view is most useful for consumers to understand and reduce their own footprints and for framing policies aimed at assisting or influencing consumers. However, given the very different perspectives (household versus national), differences in category definitions, and independent methodologies, the household carbon footprint study illustrates a similar point to the EPA report: products account for a large share of U.S. greenhouse gas emissions.

Weber and Matthews also find that by adding the international impacts of imports, the average household's carbon footprint increases by 54 percent, from 30 to 46 metric tons of carbon dioxide per year. The share associated with products and services increases to 33 percent, as shown in Table 1. Most of the 46 tons per year of emissions associated with the average household are indirect emissions. Only 8 tons of carbon dioxide per year are direct emissions, produced primarily by driving and home heating. A household "imports," in a sense, most of the goods and services that result in greenhouse gas emissions.

States and localities can control their greenhouse gas footprints by addressing products and packaging.

Most states and localities import a high proportion of products relative to what they produce. So, as with households, the difference between direct emissions and consumption-based emissions can be pronounced. Consumption-based emissions come with more uncertainty and are more complex to calculate than direct emissions, which is part of why most official greenhouse gas inventories use only the direct approach. However, using consumption-based accounting allows one to pursue many more options for reducing a greenhouse gas footprint. A household using direct emissions accounting, for example, can only reduce its carbon footprint by driving less and turning the heat down, or perhaps buying a more efficient car or furnace. A household using consumption-based accounting could reduce its footprint by choosing lower-impact products, by reusing devices rather than buying new ones, by recycling, and many other strategies, in addition to driving less and turning down the thermostat.

When developing a state or local greenhouse gas inventory, a full consumption-based accounting may not be immediately possible due to data or analytical limitations. Efforts to develop consumption-based accounting systems for communities are underway in Oregon and elsewhere. However, one can use a hybrid approach that doesn't involve the complexity and data demand of accounting for all types of goods consumed locally, but that does include some consumption categories that can be influenced to reduce greenhouse gas emissions.[7] For example, using a hybrid approach the township of Maplewood, New Jersey, found that "solid waste", a category that includes the impacts from only a portion of all products, accounts for 9 percent of the community's total emissions and 13 percent of emissions that can be addressed locally.[8] The City of Denver found that "embodied energy in materials," a category that covers only a portion of impacts from products and packaging, accounts for 10 percent of total greenhouse gas emissions.[9]

If accounting for emissions associated with products, a state or locality can use strategies like recycling and waste prevention to meet greenhouse gas reduction targets. The State of Connecticut, for example, identified recycling and waste prevention as one of its top ten strategies to reduce greenhouse gas emissions.[10] The City of Ft. Collins, Colorado, estimates that it will reach 17 percent of its greenhouse gas reduction goals in 2020 through recycling.[11]

State, local, and federal governments should adopt policies to reduce the greenhouse gas impact of products and packaging.

Products and packaging account for a substantial share of greenhouse gas emissions. In order to make the deep reductions in greenhouse gas emissions that are necessary to avoid catastrophic climate change, like the 83 percent reduction by 2050 that President Obama has called for,[12] emissions associated with products will clearly have to be reduced. Of the emissions under state and local control, those associated with products and packaging provide an opportunity for substantial and low-cost reductions. Most states and localities do not have influence over many sources of emissions in a sectors framework. They can not set their own regulations on industry, power plants, or vehicles. However, from a consumption standpoint, states and localities influence a much larger share of emissions.

Because product design influences all the stages of the product life cycle, improving product design has the most potential to reduce greenhouse gas emissions associated with products.

The EPA report "Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practice" calculates the greenhouse gas reduction potential of a variety of scenarios in waste prevention, recycling, and waste management. It finds that substantial greenhouse gas reductions are possible from these strategies. States and localities can capture the benefits in a variety of proven ways. For example, instituting Pay-As-You-Throw pricing for refuse reduces waste and encourages recycling. Improvements in recycling programs and infrastructure can also be a cost-effective way to reduce greenhouse gas emissions.

Many additional opportunities for reducing emissions can best be realized by improving product design and production. For the vast majority of products and materials that end up in a landfill, most of the environmental impacts occur during the production phase. Similarly, most of the benefits from reusing or recycling a product come from avoiding the extraction of raw materials and production of a new product to replace it.[13] Because product design influences all the stages of the product life cycle, improving product design has the most potential to reduce greenhouse gas emissions associated with products. Designs which improve product durability, reusability, recyclability, and materials efficiency all can reduce impacts from the production, transport, and disposal of products and packaging while reducing waste management burdens on local governments.

States and localities can encourage this type of design with Extended Producer Responsibility (EPR) policies.[14] EPR makes producers responsible for their products at end of life. For example, with a product take-back mandate, manufacturers and/or retailers are required to take back products after use. The mandate is typically coupled with a recycling rate target that producers must meet. Another approach is to hold producers financially responsible for their products through producer-managed advanced recycling

fees. The fee is charged according to product sales to cover the cost of recycling, and may in turn be used to subsidize recycling over disposal.

Many states, communities, and countries have successfully implemented EPR policies for a variety of product types. EPR programs are well-known to reduce waste associated with consumer products and documented increases in recycling have occurred in all countries which have implemented it.[15]

States and localities can encourage this type of design with Extended Producer Responsibility (EPR) policies.

To learn more about EPR and other ways to reduce impacts from products and packaging, visit the Product Policy Institute at www.productpolicy.org.

Conclusions

This paper discusses two major findings. The first, supported by the new EPA report, "Opportunities to Reduce Greenhouse Gas Emissions though Materials and Land Management Practices," is that products and packaging are associated with a large share of greenhouse gas emissions. A life cycle or systems perspective is needed to understand this impact. The second finding, illustrated by extending the EPA analysis here and supported by previous research by Weber and Matthews, is that the full impact of products can only be understood using consumption-based accounting. The greenhouse gas emissions associated with products are greater when the global impact of making products is taken into account.

Both the systems and consumption-based perspectives are more complex and entail greater uncertainty than the conventional sectors and direct-emissions paradigms. However, both provide more opportunities to reduce greenhouse gas emissions at low cost and with co-benefits. State and local governments can especially benefit from systems thinking and consumption-based accounting. This paper suggests improved recycling practices and Extended Producer Responsibility policies among the many tools available to reduce emissions associated with products.

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Data for Figure 1:

U.S. GHG Emissions by System	MMTCO2E	% Total
Provision of Goods	2040	29.2%
Use of Appliances and Devices	581	8.3%
Provision of Food	895	12.8%
Local Passenger Transport	1019	14.6%
Infrastructure	72	1.0%
Building HVAC and Lighting	1719	24.6%
Non-Local Passenger Transport	666	9.5%
Total	**6992**	**100%**
Products & Packaging Combined	37.5%	

Data for Figure 2:

U.S. GHG Emissions by System including Emissions Embodied in International Trade	Domestic [MMTCO2E]	Embodied In Trade [MMTCO2E]	Net [MMTCO2E]	% Total
Provision of Goods	2040	849	2889	36.9%
Use of Appliances and Devices	581	-20	561	7.2%
Provision of Food	895	11	906	11.6%
Local Passenger Transport	1019	16	1035	13.2%
Infrastructure	72	0	72	0.9%
Building HVAC and Lighting	1719	-61	1658	21.2%
Non-Local Passenger Transport	666	42	708	9.0%
Total	**6992**	**838**	**7830**	**100%**
Products & Packaging Combined	44.1%			

About PPI

Product Policy Institute is a North American non-partisan, non-profit research, communication, and educational organization. It promotes policies that advance sustainable production, consumption, and good governance. Founded in 2003, PPI works with communities and their local governments to advocate for public policies that protect public health and safety and address climate change by encouraging waste prevention and clean production. PPI has helped local governments establish Product Stewardship Councils in California, New York, Vermont, and Texas, and is currently working in other states.

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