# CalRecycle Packaging Workshop Background Paper:

# Increasing collection and recovery of packaging in California

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# I. Introduction

The purpose of this paper is to present, for stakeholder input, potential policy approaches to increase the collection and recovery of packaging in California's disposal stream toward meeting the goals of Assembly Bill (AB) 341. The sections that follow describe CalRecycle's drivers for addressing packaging, a spectrum of approaches utilized elsewhere, an analysis to identify priority packaging products, and potential policy approaches in order of CalRecycle preference. The paper also presents a proposed definition and scope to help frame the discussion on policy approaches.

This follows a December, 12, 2013 CalRecycle packaging workshop that included expert panelists and break-out discussions to explore key considerations to increasing the source reduction and recovery of packaging in California. Robust discussion occurred amongst the 45 in-person attendees and 82 webinar participants, representing consumer products companies, non-governmental organizations, packaging companies, the recycling and solid waste industries, various industry associations, consultants, local governments, public and private institutions, and more. The following key take-aways from that workshop were considered during the development of this paper and Fall 2014 workshop (in no particular order):

1. Industry, government, and others involved in the product chain need to work together
2. Infrastructure needs must be addressed (e.g., how to maximize existing, pay for additional, etc.)
3. Packaging has many functions (e.g., Role of innovation as part of the solution as well as the problem)
4. Need for engaging, educating, and motivating the consumer
5. Is there a role for harmonization of standards?
6. Life cycle assessment and lifecycle thinking should somehow be utilized
7. Focus on and expand existing programs that work
8. Need for metrics for program evaluation
9. What is the role of energy recovery from unrecoverable/unrecyclable packaging materials?
10. How should packaging recovery be funded?

# II. Why Packaging?

## AB 341: CalRecycle's 75% Initiative

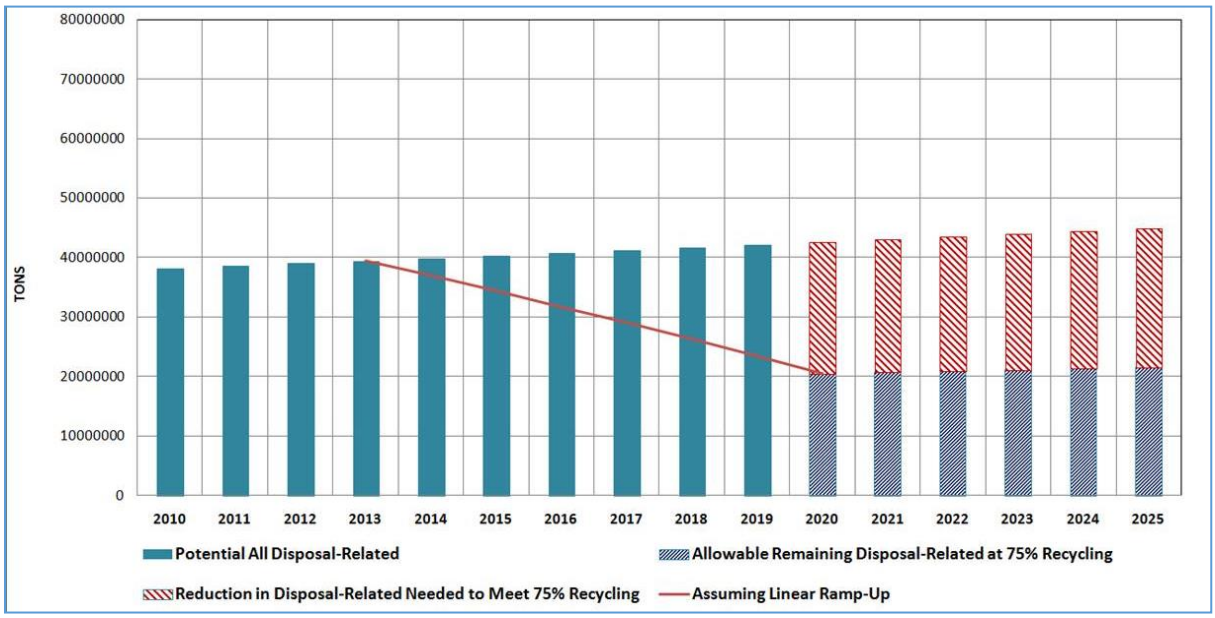
CalRecycle oversees non-hazardous end-of-use materials management in California through a variety of recycling and other management programs and approaches. The passage of AB 341 (Chapter 476, Statutes of 2011) established a statewide policy goal for California that not less than 75 percent of the solid waste generated be source-reduced, recycled, or composted by 2020 and directed CalRecycle to develop a statewide strategy to reach this goal. As part of the 75% Initiative, CalRecycle developed six focus areas to explore, including:

1. Moving Organics Out of the Landfill
2. Continuing Reform of the Beverage Container Recycling Program
3. Expanding the Recycling/Manufacturing Infrastructure
4. Exploring New Models for State and Local Funding of Materials Management
5. Promoting State Procurement of Postconsumer Recycled Content Products
6. Promoting Extended Producer Responsibility

Based on projected waste disposal, an additional 22 million tons of source reduction, recycling, and composting must occur in order to meet this goal (see Figure 1). Staff estimates that packaging

comprises about 9.5 million tons[1], or about one quarter, of California's disposed waste annually (see Appendix 1), clearly representing a significant opportunity to help achieve California's 75 percent goal.

Figure 1. Future Reduction in Disposal Needed to Meet 75% Recycling




## Greenhouse Gas, Marine Debris, and Water Impacts

Ineffective end-of-use materials management is a cross media concern. CalRecycle is either directly or indirectly engaged in activities that attempt to address multiple concerns such as greenhouse gas (GHG) emissions and water impacts associated with end-of-use materials management. Additionally, each year the Legislature considers potential legislative means to address these and other concerns. Examples of proposed and enacted packaging-related legislation include product-specific bans, requirements for minimum post-consumer content and certain labeling and marketing claims, and extended producer responsibility for marine plastic pollution. CalRecycle is frequently identified as an implementing or oversight agency in such legislation.

CalRecycle works closely with its sister agency, the California Air Resources Board, on efforts to implement the California Global Warming Solutions Act of 2006. The 2014 Scoping Plan Update document reviewed progress to-date and presented recommendations for seven different sectors on 2020 and 2050 GHG reduction goals. One of the sectors is the Waste Management Sector[2]. The update stated that the Scoping Plan:

- Is closely tied with the 75% Initiative;
- Laid out potential for waste sector to achieve significant additional GHG reductions; and

[1] Based on data from the California Integrated Waste Management Board, California 2008 Statewide Waste Characterization Study, August 2009 (available at: http://www.calrecycle.ca.gov/Publications/Documents/General/2009023.pdf) and described in Appendix 2.)

[2] This includes all municipal and commercial solid waste-related activities (e.g., collection, processing, recycling, remanufacturing, treatment, or disposal) from generation to final disposition of the material within California (except medical and hazardous wastes).

- Included recognition of packaging issues and the need to promote source reduction principles into packaging and product design, and to foster recycling and recyclability as a front-end design parameter for packaging and products that cannot be reduced.

In the realm of water-related impacts, the California State Water Resources Control Board (State Water Board) is proposing amendments[3] to Statewide Water Quality Control Plans to control trash in an effort to provide statewide consistency in managing trash in California's waterways. According to the State Water Board, trash that finds its ways to the state's waterways includes cigarette butts, paper, fast food containers, plastic grocery bags, cans and bottles, used diapers, construction site debris, industrial preproduction plastic pellets, old tires, and appliances. Many of these items include packaging products. The proposed amendments would affect local and regional governments who must meet the requirements. In terms of costs borne by local governments, California communities annually spend more than $428 million to combat litter and prevent it from entering the state's waterways[4]. Further, as an example of costs to local jurisdictions to meet trash Total Maximum Daily Load (TMDL) requirements, Southern California cities have spent to date well over $1.7 billion in meeting the requirements of trash TMDLs required under the Clean Water Act[5].

Marine debris is another water-related issue that is significant to California as it is known to threaten sensitive ecosystems, harm hundreds of wildlife species, interfere with navigation, degrade natural habitats, cost millions of dollars in property damage and lost revenue from tourism and commercial fishing activities, and threaten human health and safety[6]. Further, California has more than 1,100 miles of coastline and a $46 billion ocean-dependent economy[7]. Accumulations of coastal debris can pose threats to the economy of coastal communities, especially in tourist areas[8]; significant since in 2011, employment in coastal tourism and recreation in California accounted for 351,997 jobs[9].

## Trends in Packaging that Affect Recovery

As companies seek new ways to differentiate their products, reduce costs, and appeal to consumers, trends in packaging such as light weighting, optimizing the product-to-package ratio, and moving from rigid to flexible packaging have emerged. In many cases, this yields positive environmental and social benefits as well as economic benefits to those companies. Examples can include increased shelf-life, reduction in energy use and transportation emissions, less volume in the landfill, prevention of food loss, consumer protection, and increased convenience to the customer. Despite this, packaging still comprises about one quarter of California's disposal stream (see Appendix 1). When the end-of-use is not taken into consideration during the package design stage, end-of-use recovery can be limited or inhibited. This, in turn, contributes to the impacts described above. For example, packaging can present a dilemma at the end-of-use when it:

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[3] http://www.waterboards.ca.gov/water_issues/programs/trash_control/documentation.shtml

[4] Waste in our water: the annual cost to California communities of reducing litter that pollutes our waterways, August 2013. Accessed at: http://docs.nrdc.org/oceans/files/oce_13082701a.pdf

[5] California Ocean Protection Council. An Implementation Strategy for the California Ocean Protection Council Resolution to reduce and Prevent Ocean Litter. 20 November 2008.

[6] Natural Resources Defense Council, Testing the Waters 2013: A Guide to Water Quality at Vacation Beaches: The Impacts of Beach Pollution, www.nrdc.org/water/oceans/ttw/health-economic.asp.

[7] NOEP. California's Ocean Economy, National Ocean Economics Program. July 2005: 24-26.

[8] Monitoring Bathing Waters - A Practical Guide to the Design and Implementation of Assessments and Monitoring Programmes, 2000 (accessed at http://www.who.int/water_sanitation_health/bathing/monbathwat.pdf).

[9] NOEP. Coastal and Ocean Economic Summaries of the Coastal States, National Ocean Economics Program, 2014.

- **Cannot be recycled.** The lack of technical and economic feasibility prevent widespread recycling of the material.
- **Contaminates the recycling stream.** The package material is difficult for residents and/or processors to correctly identify to determine how best to manage at end-of-use (e.g., newly-introduced and/or poorly labelled materials, or materials with incompatible ingredients), or the collection method of the package leads to the package itself slowing down and/or damaging processing equipment.
- **Lacks adequate end markets.** Innovations in material type and/or application occur faster than end-of-use markets are able to develop. The package is not collected in sufficient quantity to process economically (e.g., degradable resins or uncommon polymer blends).
- **Requires additional and/or specialized processing equipment.** Where technical feasibility exists but the processing facility does not have the adequate equipment and/or resources to retool existing equipment to separate the material economically (e.g., multi-material or multi-layered packages).
- **Requires additional end-of-life energy inputs.** Adding new materials to an existing recovery system may require more energy, negating energy savings (and greenhouse gas reductions) elsewhere in the product life cycle.
- **Escapes into the environment.** The package ends up in the environment as litter or marine debris for a variety of reasons such as poor collection/transportation management practices or lack of consumer education for proper end-of-use management.

## III. Proposed Definition, Scope, and Priority Packaging Product Selection

Any proposed activity or combination of activities designed to significantly increase the collection and recovery of packaging in California will need to include a broad scope of packaging products (see Proposed Definition and Scope, below). However, there are thousands of packaging products and so it also makes sense to identify a smaller set of priority packaging products that, at a minimum, should be included in any proposed activities. For purposes of this discussion, the following describes staff's rationale for suggesting such a set of priority packaging products.

### Packaging in California's Disposal Stream

Staff endeavored to identify, in as much detail as possible, those packaging materials and products found in the disposal stream. The most current, readily-available data on U.S. packaging generation and disposal, California packaging disposal, and Ocean Conservancy International Coastal Cleanup disposal were analyzed. Data collection and methodologies vary by source, as described in Appendix 1.

Based on California waste characterization data, roughly one quarter of what is currently disposed each year is packaging-related. Paper represents the overwhelming majority of the packaging disposal stream in California, roughly double that of plastic packaging disposal (about 5.3 and 2.5 million tons, respectively). Together, paper and plastic comprise over 90 percent of the total packaging materials disposed. This is generally consistent with U.S. EPA data, which shows plastic and paper and paperboard representing over 57 percent of the total container and packaging category. Further, staff analysis concluded that packaging comprises over 60 percent of all materials collected at International Coastal Cleanup events. See Appendix 1 for further explanation of data and sources.

### Existing Definitions

Packaging, as a broad category of thousands of products, is defined through statute and regulation throughout the world. Additionally, specific types of packaging might be defined by trade associations

and other voluntary activities. For example, the Flexible Packaging Association provides its own definition of flexible packaging. Table 1 provides a description of three existing definitions and product scopes in Europe and North America. This is not intended to be a comprehensive list, but rather to provide examples of how packaging is defined elsewhere.

Table 1. Examples of Existing Packaging Definitions and Scope

| **Jurisdiction/ Program** | **Voluntary or Mandatory** | **Definition** | **Scope (e.g., Residential, Industrial, Institutional, Commercial Sectors)** |
|---|---|---|---|
| European Parliament and Council Directive 94/62/EC of December 1994 on Packaging and Packaging Waste[10] | Mandatory | All products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. 'Packaging' consists only of:<br>(a) sales packaging or primary packaging, i.e. packaging conceived so as to constitute a sales unit to the final user or consumer at the point of purchase;<br>(b) grouped packaging or secondary packaging, i.e. packaging conceived so as to constitute at the point of purchase a grouping of a certain number of sales units whether the latter is sold as such to the final user or consumer or whether it serves only as a means to replenish the shelves at the point of sale; it can be removed from the product without affecting its characteristics;<br>(c) transport packaging or tertiary packaging, i. e. packaging conceived so as to facilitate handling and transport of a number of sales units or grouped packagings in order to prevent physical handling and transport damage. | All packaging placed on the market in the community and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used. |
| British Columbia Packaging and Printed Paper[11] | Mandatory | A material, substance or object that is used to protect, contain or transport a commodity or product, or attached to a commodity or product or its container for the purpose of marketing or communicating information about the commodity or product.[12] Includes printed paper, which means paper that is not packaging, but is printed with text or graphics as a medium for communicating information, and includes telephone directories, but does not include other types of bound reference books, bound literary books, or bound text books. See Multi-Material British Columbia comprehensive materials list here: http://recyclinginbc.ca/wp-content/uploads/2014/03/Materials_List_PDF_Updated.pdf | Residential and municipal property that is not industrial, commercial or institutional property |
| Australia Packaging Covenant[13] | Voluntary | "Consumer packaging" means all packaging products made of any material, or combination of materials, for the containment, protection, marketing or handling of consumer products. Also includes distribution packaging.<br>"Distribution packaging" means packaging that contains multiples of products (the same or mixed) intended for direct consumer purchase, including:<br>• Secondary: packaging used to secure or bundle multiples of consumer product, for example, cardboard box, shipper, shrink film overwrap.<br>• Tertiary: packaging used to secure or bundle multiples of secondary packaging, for example, pallet wrapping stretch film, shrink film, strapping. | Consumer packaging |

[10] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=URISERV:l21207&from=EN&isLegissum=true, accessed 7/16/14.
[11] British Columbia Environmental Management Act Recycling Regulation. http://www.bclaws.ca/Recon/document/ID/freeside/449_2004#Schedule5, accessed 7/16/14.
[12] British Columbia Environmental Management Act. http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/03053_00, accessed 7/16/14.
[13] http://www.packagingcovenant.org.au/, accessed 7/16/14.

## Proposed Definition and Scope

Staff proposes a broad definition and scope of packaging, similar to those of the European Union:

> **Definition:** All products made of any materials of any nature to be used for the containment, protection, handling, delivery, and presentation of goods to the consumer.
>
> **Scope:** all packaging placed on the California market and all packaging waste, whether it is used or disposed at industrial, commercial, office, retail, household, or any other level, regardless of the material used[14].

CalRecycle views this as a well-established definition and scope that many manufacturers, producers, brand owners, designers, and others in the packaging supply chain are aware of and often operate under, whether in the context of an Extended Producer Responsibility (EPR) or other mandatory scheme.

## Methodology to Determine Priority Packaging

There are three main types of methodologies that can be used to determine priority packaging products. The first is a purely quantitative analysis where numeric data is collected and analyzed. This sort of data would include such things as tons disposed, cost to local governments to manage, or amount recycled. The major advantage of this kind of analysis is that the numbers are easy to analyze statistically and they are impartial. The second kind of analysis is purely qualitative where descriptions and other words are used to convey the evaluation. This sort of data would include things like whether there is stakeholder concern or if the material is difficult for consumers to handle. In this approach, some data can only be expressed through words and therefore must be qualified. The third and last approach is simply a combination of the two others. This approach is appropriate when some numeric data exists while a significant amount of qualitative data must also be collected.

Staff chose to evaluate the packaging products or product categories using the third option, a combination of quantitative and qualitative data. Much of the data used for this evaluation was qualitative primarily because of a lack of data availability and the level of effort and resources to obtain a larger amount of quantitative information to evaluate was not necessary for purposes of this discussion. In other words, the department believes enough is known about packaging product and material categories in California's disposal stream to support this level of evaluation.

The process of priority packaging product selection includes three main steps:

1. Determine list of packaging materials, products, or product categories to be considered;
2. Determine evaluation criteria; and
3. Conduct a screening process to identify priority packaging products on which to focus department efforts.

First, the packaging products or product categories to be evaluated in this process were identified. Then the criteria to use in evaluating the packaging products or product categories were selected. The criteria are a list of factors that are most important and best able to determine those packaging products or product categories most suitable for identification as a priority for CalRecycle to address. The third step is to evaluate all of the packaging products/product categories against the criteria. This process was split into two stages, the first intended to quickly identify material types that represent a major component of the packaging disposal stream, and the second step applied a slightly larger set of criteria to packaging products or product categories whose material types passed the first stage of the process.

[14] Substantially similar to the EU definition and scope.

## 1. List of Packaging Products or Product Categories

Listing individual packaging products (e.g., pouches, cartons, etc.) is not feasible due to the immense number of individual packaging products on the market and in the disposal stream. Additionally, the more specific the packaging type, the less data are available. For these reasons, staff first analyzed packaging by material type. Table 2 shows the list of five packaging material types analyzed and some specific examples of corresponding packaging products. The list of products is not meant to be comprehensive of all packaging products within each of the material types.

Table 2. List of Packaging Products by Material Type

| **Packaging Material Type** | **Description**[15] |
|---|---|
| Paper | Uncoated corrugated cardboard |
| | Aseptic containers and cartons (e.g., milk cartons, ice cream cartons, etc.) |
| | Other miscellaneous paper (e.g., paper packaging for over-the-counter medications, containers for printer ink or toner cartridges, non-corrugated consumer electronics packaging, cereal and cracker boxes, unused paper plates and cups, frozen food boxes, pulp paper egg cartons, unused paper plant pots, fast food wrappers, etc.) |
| Glass | E.g., Clear, green, brown, and other glass bottles and containers. |
| Metal | E.g., Tin/steel and aluminum cans and containers used to store food, beverages, paint, and a variety of other household and consumer products. |
| Plastic | Natural and colored high-density polyethylene (HDPE) containers, not including HDPE buckets of five gallons or less in size. This plastic is usually either cloudy white, allowing light to pass through it (natural) or a solid color, preventing light from passing through it (colored). When marked for identification, it bears the number 2 in the triangular recycling symbol and may also bear the letters HDPE. E.g., milk jugs, water jugs, detergent bottles, some hair-care bottles, HDPE sealed containers (must be cut, pried, or torn to be opened), empty motor oil, empty antifreeze, and other empty vehicle and equipment fluid containers. |
| | Plastic containers made of PVC, LDPE, PP, PS, EPS, or mixed resins. E.g., salad dressing bottles, vegetable oil bottles, flexible and brittle yogurt cups, containers, vitamin bottles, foam egg cartons, and single-use clamshell take-out food containers. |
| | Degradable plastics (e.g., PLA) |
| | Film plastic, including food-contact film packaging (e.g., was sold holding a food product such as meat or cheese). Other examples include produce bags, frozen vegetable bags, bread bags, candy bar wrappers, plastic sandwich bags, newspaper bags, etc. |
| | Pouches made of thicker, multi-layer flexible material. May have a flat bottom so that package would stand up on its own, but not always. Material is thicker than potato chip bags and frozen vegetable bags. Includes plastic coffee bags like Starbuck's and Peet's; Capri Sun pouches, baby food pouches, soap and detergent pouches, and other similar items. |
| Wood | E.g., clean pallets and crates such as unpainted wood pallets, crates, and packaging made of lumber/engineered wood. |

## 2. Evaluation Criteria

Five criteria were utilized to evaluate priority packaging material types. There are many other potential criteria that could be used. A balance needs to be found however, between fully examining all aspects of a product's suitability and the number of criteria used. Table 3 describes the criteria selected.

[15] Based, in part, on CalRecycle 2008 Statewide Waste Characterization Study Definitions found at: http://calrecycle.ca.gov/Publications/Documents/General/2009023.pdf

Table 3. Filter Criteria and Descriptions

| Criteria Name | Criteria Description |
|---|---|
| ***Primary Criteria*** | |
| Significant portion of waste stream | Does the packaging product/product category contribute significantly to the overall total waste stream, representing an opportunity for California to achieve 75 percent recycling by 2020? |
| ***Secondary Criteria*** | |
| Increasing or steady usage trend | Is product usage holding steady or increasing? If the product is being slowly phased out of use anyway, there is little use in pursuing it with a new program. |
| GHG impacts | Does the package product/product category present a potential GHG impact at end-of-use? |
| Water quality impacts | Does the packaging product/product category contribute to trash-related water quality concerns and/or negatively impact the marine environment? |
| Opportunities exist for new efforts | Is the market currently dealing with this packaging product/product category? Do we need to create a new market? Are other programs already in place for this product? |

The primary criterion "significant portion of the waste stream" was chosen because it represents end-of-use impacts which fall directly under CalRecycle's purview. The remaining criteria address end-of-use impacts that contribute to the overall waste stream and their likelihood to continue to do so; cross-media impacts over which CalRecycle works in close collaboration with other agencies to address; and/or impacts that are of interest to the Legislature and within the Department's purview. A final criterion was whether opportunities exist for new efforts to address priority products in a timely manner.

## 3. Applying the screening process to identify priority packaging products

The primary and secondary filters were used to narrow down the list of packaging products or product categories in Table 2.

**Primary Filter**

The primary filter consisted of the first evaluation criterion: significant portion of the waste stream. A determination of "yes" or "no" was made based on data presented in Appendix 1.

Table 4. Results of Primary Filter Step

| ***Material Type*** | ***Significant Portion of Waste Stream*** |
|---|---|
| ***Paper*** | *Yes* |
| ***Glass*** | *No* |
| ***Metal*** | *No* |
| ***Plastic*** | *Yes* |
| ***Wood*** | *No* |

**Secondary Filter**

After completion of the primary filtering step, some specific paper and plastic packaging product types identified in Table 2 were screened through the secondary filter criteria. The secondary filter is meant to address some finer distinctions between products in order to determine which products warrant consideration as priority packaging products. As previously noted, this level of analysis is both data-dependent and qualitative and therefore subject to interpretation. Since this filter is meant to draw a high-level correlation between the packaging product and associated impact, the list below may be considered preliminary and as a starting point for further discussion.

Table 5. Secondary Filter

| | ***GHG Impacts***[16] | ***Water Quality Impacts***[17] | ***Opportunities Exist for New Efforts***[18] | ***Increasing or Steady Usage Trend*** |
|---|---|---|---|---|
| ***PAPER*** | | | | |
| ***Uncoated corrugated cardboard*** | ***High*** | ***Low*** | ***Med*** | ***Med*** |
| ***Aseptic containers and cartons*** | ***High*** | ***Low*** | ***Low*** | ***High*** |
| ***Other miscellaneous paper*** | ***High*** | ***Low*** | ***Low*** | ***Med*** |
| ***PLASTIC*** | | | | |
| ***HDPE containers*** | ***Low*** | ***Med*** | ***Med*** | ***Low*** |
| ***Plastic containers (e.g., PVC, LDPE, PP, PS, EPS, or mixed resins)*** | ***Med*** | ***High*** | ***Med*** | ***Med*** |
| ***Degradable plastics*** | ***Med*** | ***Med*** | ***Low*** | ***High*** |
| ***Pouches*** | ***Med*** | ***Med*** | ***Low*** | ***High*** |
| ***Plastic film*** | ***Med*** | ***Med*** | ***Low*** | ***High*** |

Table 6. Packaging Products Passing Second Filter

| |
|---|
| *Uncoated corrugated cardboard* |
| *Aseptic containers and cartons* |
| *Other misc. paper* |
| *Plastic containers (e.g., PVC, LDPE, PP, PS, EPS, or mixed resins)* |
| *Degradable plastics* |
| *Pouches* |
| *Plastic films* |

[16] Method for Estimating Greenhouse Gas Emissions from Recycling, California Air Resources Board, November 14, 2011. Accessed at: http://www.arb.ca.gov/cc/protocols/localgov/pubs/recycling_method.pdf.
[17] E.g., 2012 Ocean Conservancy data, SWRCB trash policy
[18] E.g., Are Closed Loop Fund, Recycling Partnership, other opportunities available/likely?

## IV. Priority Packaging Product Selection Results

After assessing the packaging material types against the evaluation criteria, seven packaging products/product categories were identified as priority packaging products:

**Uncoated corrugated cardboard** represents a significant portion of California's disposed packaging waste stream and represent a significant source of GHGs when landfilled.

**Aseptic containers and cartons** are increasing in packaging applications for reasons including their ability to preserve food products without the need for refrigeration or additional preservatives. It is estimated that aseptic packaging is one of the fastest-growing packaging segments, growing at 9 percent annually[19]. Aseptic packages are predominantly paper-based, with thin layers of polyethylene plastic and aluminum. While the Carton Council asserts that access to recycling has been improving, with 50 percent of U.S. households now having access to carton recycling through curbside and other local recycling programs[20], a recent report by Californians Against Waste claims that there is little evidence to demonstrate that carton recycling is occurring in California beyond negligible amounts[21].

**Other miscellaneous paper** represents a significant portion of California's disposed packaging waste stream and represent a source of GHGs when landfilled.

**Plastic containers (e.g., PVC, LDPE, PP, PS, EPS, or mixed resins)** comprise a subset of container types that is currently not collected and recycled as readily as other container types, due in part to conditions such as limited collection volumes and mixed resin containers that make it infeasible to recycle economically.

**Degradable plastics** are increasing in use in packaging applications. As one example of trends in this complex area, the global biodegradable plastic packaging market is expected to grow at a compound annual growth rate of 18% from 2013 to 2019 to reach a value of $8.4 billion, and the fastest growth in the biodegradable packaging market is expected to come from food packaging and beverage packaging application segments[22]. Innovations in formulations, while sometimes achieving environmental improvements from a lifecycle perspective, tend to outpace existing end-of-use recycling and processing systems, and can disrupt existing processing systems by acting as contaminants in recycling and processing feedstock.

**Pouches** are also increasing in use in packaging applications, often replacing traditional rigid containers. Pouches are a layered material mostly consisting of plastics, paper, and aluminum, with each layer serving a different purpose (e.g., an oxygen and/or moisture barrier). While these qualities often allow the package to achieve environmental improvements at certain stages from a lifecycle perspective as compared to traditional containers such as glass or metal, they are currently technically and economically infeasible to recycle[23] and instead primarily end up in the disposed waste stream.

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[19] http://www.foodproductiondaily.com/Packaging/What-s-driving-growth-in-the-35.8bn-aseptic-packaging-market

[20] http://www.cartonopportunities.org/sites/default/files/files/CCNA%2050%20percent%20release%20FINAL.pdf

[21] Boxed In: A Better Plan for Carton Recycling in California. Californians Against Waste. Accessed at http://www.cawrecycles.org/files/Snapshot_of_Carton_Recycling.pdf.

[22] http://www.foodandbeveragepackaging.com/articles/87083-global-biodegradable-packaging-market-growing-at-1805-cagr-to-2019

[23] Pouches are also downcycled into other products on a limited basis.

**Plastic films**, similar to pouches, are increasing in use in packaging applications, often replacing traditional rigid containers. When collected at curbside, film plastic can be problematic to capture in sufficient clean quantities to successfully and recover economically.

## V. Policy Approaches under Consideration

The following policy strategies represent, in the order of CalRecycle preference, approaches to address the source reduction and recovery of packaging in California's disposal stream, followed by some examples of each approach that could be employed alone or in combination with other activities. For purposes of discussion at the November 2014 public workshop, the approaches should be considered in context of the aforementioned proposed packaging definition and scope.

CalRecycle also notes, however, that packaging products also are regulated in some manner under the Beverage Container Recycling Program (BCRP) and the Rigid Plastic Packaging Container (RPPC) Program. Readers should note that proposals to restructure the BCRP are being addressed through a separate, parallel process; therefore, BCRP-covered containers should not be considered in context of the policy approaches described in this document. CalRecycle is interested, however, in stakeholder perspectives on how the BCRP may serve as a model for non-BCRP packaging products. Additionally, while CalRecycle is implementing the recently-completed RPPC Program regulations, the department is interested in how that program should be handled under each policy approach, including potential structural changes that stakeholders view as necessary to implement each approach most successfully.

### MANDATORY INITIATIVES

The California State Legislature increasingly considers a wide variety of bills intended to minimize negative environmental impacts associated with packaging. The bills range from sales bans (e.g., single-use plastic carryout bags) to new labeling requirements for plastics (e.g., terms such as "compostable" or "marine degradable") to comprehensive EPR requirements (e.g., EPR for marine plastic pollution). There is similar interest at the federal level, as evidenced by the introduction of H.R. 5283, the Land Based Marine Debris Reduction Act in June 2014. As introduced, that bill would, among other things, enable the U.S. Environmental Protection Agency to identify categories of products or packaging to target for regulatory action, promulgate regulations requiring manufacturers to use recovered materials in those categories, and develop a system of voluntary standards for packaging. While H.R. 5283 has not been enacted as of the time this paper was written, it appears that packaging-related legislation will continue to garner interest at both the state and federal level.

CalRecycle believes that the development of a rational mandatory approach is necessary for California to reach its 75 percent goal, while acknowledging that determining how best to structure a mandatory approach for packaging is an incredibly complex undertaking. Careful consideration must be given with regard to how new statutory requirements may affect existing obligations for the regulated community and existing voluntary efforts, without creating unintended consequences that could undermine overall social, environmental, and economic objectives. Consideration must also be given to acknowledge the efforts of those manufacturers and brand owners that have already made strides to minimize the negative end-of-use impacts of their packaging. Appendix 2 (End-of-Use Packaging Management Matrix) describes a variety of packaging end-of-use management approaches and examples, as one means of identifying such high-level considerations. The list includes representative examples of existing efforts and is not meant to be inclusive of all efforts currently undertaken. The range of voluntary approaches includes individual and collective company, multi-stakeholder, and industry association initiatives. Mandatory approaches include product- and sector-specific laws and regulations. These management options were analyzed to highlight some pros and cons relevant to the department's current packaging discussions, as well as whether or not they have or could potentially interact with existing programs

overseen by CalRecycle, including the Rigid Plastic Packaging Container Program, Beverage Container Recycling Program, Mandatory Commercial Recycling (MCR) Program, and the new Greenhouse Gas Grant and Loan Programs. However, CalRecycle's preference for a mandatory approach reflects a culmination of efforts including extensive departmental experience implementing a wide array of packaging-related and other solid waste legislation and both conducting and participating in a variety of stakeholder discussions.

Mandatory approaches generally provide the regulated community and other decision-makers with consistency and predictability in terms of requirements and standards. This can assist long-term decision-making efforts and investments that can lead to increased quantities of materials collected and ultimately help drive down costs of collection and processing. Mandatory options also offer the ability to ensure that enforceable goals are met within specified timeframes, a key advantage considering the 75% Initiative's upcoming policy target date of 2020.

An overall limitation of mandatory initiatives is that CalRecycle would require statutory authority to implement such an approach. Additionally, once requirements are set in statute, they cannot be modified without additional legislation. Statutory language should provide enough flexibility for subsequent regulations to make necessary clarifications. For example, rather than establishing numeric goals in statute when not enough is known about baseline conditions, it might be beneficial to set up a process to establish goals within a specified timeframe. This could allow time to collect necessary data and promulgate regulations to more effectively carry out the intent of the legislation. Another example is to provide a straight-forward, broad definition of packaging that the department could further clarify via regulations if needed. This approach provides more flexibility to modify as necessary over time, as opposed to a detailed statutory definition that cannot be changed easily.

Examples of mandatory initiatives that could be pursued include, but are not limited, to:

### EPR, with or without a complementary initiative such as landfill ban on recyclables (below)

An Extended Producer Responsibility approach could require producers, as defined (e.g., manufacturers, brand owners, first sellers into the state), to design, finance, and implement a statewide program to collect and properly manage packaging sold into the state. CalRecycle would set goals that could include source reduction, recycling rate, and statewide coverage, in addition to approving stewardship plans and annual reports and enforcing the law to maintain a level playing field.

Key considerations include, but are not limited to:

- Adequate and appropriate coordination with local jurisdictions regarding how their operations, facilities, and program financing might be impacted by the program and ways to mitigate negative impacts;
- Defining goals and associated key metrics to track program performance;
- Defining producers and any other potential regulated entity to ensure a level playing field while minimizing CalRecycle resources necessary to oversee and enforce the program;
- How to acknowledge already significant efforts employed by producers to source-reduce and design for recyclability, etc.;
- How to design the program to encourage source reduction and front-end design consideration to minimize negative impacts on collection and recovery operations;
- What level of competition is desirable; and
- Appropriate level of harmonization with existing packaging EPR programs and other California packaging programs (e.g., beverage containers, RPPC).

### Landfill bans on recyclables

This approach would prohibit recyclables, as defined (e.g., OCC, newspaper, glass containers, plastic containers, etc.), from being accepted at and landfilled in California. This approach could include varying levels of enforcement at the state and/or local level.

Key considerations include, but are not limited to:

- List of recyclables covered under ban;
- Whether the ban is at local or state level;
- Enforcement approach (active vs reactive); and
- Potential impacts if implemented as a stand-alone measure (e.g., "ban without a plan")

### Minimum recycled content

This approach would require a specified package or packaging category sold into the state to contain a minimum amount of post-consumer material.

Key considerations include, but are not limited to:

- Determination of appropriate product/product category;
- Appropriate level of post-consumer content;
- Appropriate level of harmonization with existing minimum-content programs (e.g., glass containers, RPPCs, plastic bags);
- How best for regulated community to adequately and efficiently demonstrate compliance; and
- How to encourage post-consumer material use while being the least disruptive to package and product innovation

## VOLUNTARY ACTIVITIES

Voluntary approaches play an important role in context of AB 341's 75 percent goal, whether through research and collaboration, identifying potential solutions, or engaging of stakeholders to increase collection and recovery of packaging. For example, they show promise for leveraging existing or new mandatory efforts, such as the Closed Loop Fund assisting some California businesses to comply with the MCR Program. There has been a rise over the years in voluntary efforts by companies and brand owners to increase the overall sustainability of packaging for reasons such as decreasing supply chain costs and ultimately costs to companies and consumers; increasing consumer convenience; increasing product sales through differentiation in the marketplace; responding to consumer and shareholder pressure to decrease the negative environmental impacts associated with packaging; and attempting to avoid potential legislative requirements.

An overall limitation of voluntary approaches is that, by nature, they lack the ability to provide a secure, consistent mechanism for the kind of progress that can help California achieve the goal of 75 percent by 2020 because individual and collective commitments can change based on a variety of factors with or without public consultation or notice. Another significant observation is that voluntary efforts tend to focus on solving or optimizing the back-end dilemmas associated with packaging, such as end-of-use collection and processing. Approaches that focus on these back-end dilemmas do not necessarily address source reduction or other upstream impacts at the design stage; the increased costs associated with collection and processing; and end markets for a constantly-evolving packaging disposal stream. Perhaps most significantly, this approach has not, to date, identified the consistent, comprehensive financing strategies necessary to collect and recover the more than 9 million tons of packaging sent to landfill in California each year. Instead, it is presumed that California's local jurisdictions will continue to

shoulder these costs via funding sources such as garbage rates, property taxes, and General Fund sources.

### Voluntary activities with threshold to pursue mandatory initiatives

Examples of this approach could include identifying and building upon existing voluntary industry initiatives and soliciting new initiatives to commit California-specific resources towards increasing the source reduction and recycling of packaging in California's disposal stream. Shared goals and metrics could be developed via a broad stakeholder process. This approach would identify a threshold, based on shared goals, and associated timeline to meet those goals, after which point mandatory activities would be pursued. A timeline could phase in the activities (e.g., pursue "low-hanging fruit" initially while laying the groundwork for more complex activities and initiatives). Examples of voluntary initiatives to pursue in California include, but are not limited to:

- Closed Loop Fund
- Recycling Partnership
- Association of Postconsumer Plastic Recyclers Grocery Rigid Plastics Program

Key considerations include, but are not limited to:

- Identifying appropriate and complementary set of initiatives to drive meaningful results; in particular, those that encourage source reduction and front-end design consideration to minimize negative impacts on collection and recovery operations;
- Identifying appropriate shared goals and metrics; and
- Identifying an appropriate timeline for goals to be met;

## VI. Feedback on Proposed Definition, Scope, and Policy Approaches

CalRecycle encourages stakeholder participation in discussion of the proposed definition and scope of packaging and policy approaches as presented in this document. While CalRecycle welcomes all feedback, comments, and concerns, for purposes of the November 13, 2014 workshop, the department solicits specific feedback on the questions below:

Definition and Scope

1. What are the significant opportunities and challenges associated with each?
2. Are there suggested alternative approaches, selection criteria, etc., and what is the rationale for the suggestion(s)?

Policy Approaches

1. What would need to happen for the approach to be successful? Who needs to be engaged?
2. How does the approach impact/complement existing California programs?
3. What are some possible undesirable unintended consequences of the approach and how might these be mitigated?
4. What key considerations do you think are missing for each approach?

Appendix 1. Packaging in the Disposal Stream

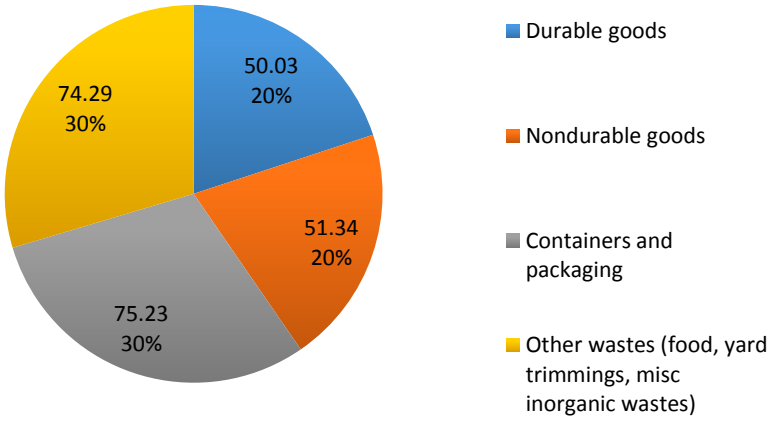
***Packaging Products and Materials in the U.S. Disposal Stream***

The U.S. EPA utilizes a mass balance approach to estimate material and product generation, recycling, and disposal for municipal solid waste[24]. Data is collected from a variety of sources such as industry associations, the U.S. Department of Commerce and Census Bureau, as well as other government and business sources.

According to U.S. EPA's 2012 waste characterization report[25], containers and packaging comprise 30 percent (75 million tons) of the total municipal solid waste generated in the United States annually (see Figure 2[26]). Products in this category include bottles, containers, corrugated boxes, milk cartons, folding cartons, bags, sacks, and wraps, wood packaging, and other miscellaneous packaging.

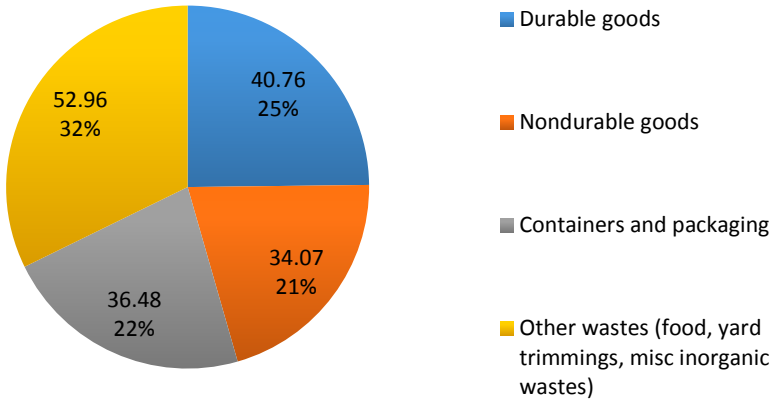
While the U.S. EPA estimates that just over 50 percent of the total containers and packaging generated are recovered (39 million tons), this category still represents a significant portion of the total municipal solid waste that is discarded (22 percent or roughly 36 million tons), as illustrated in Figure 3[27].

Figure 2. Categories of Products Generated in the Municipal Solid Waste Stream, Tons (millions)



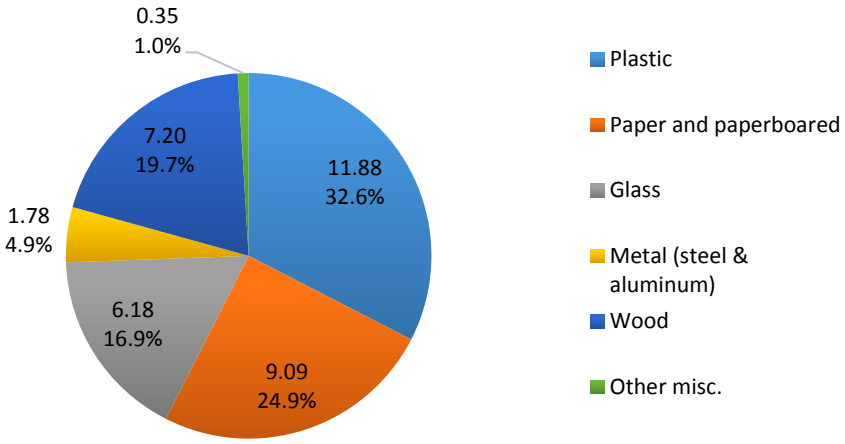

[24] EPA data does not include construction & demolition debris, industrial process wastes, or certain other wastes.
[25] U.S. Environmental Protection Agency, *Municipal Solid Waste Generation, Recycling, and Disposal in the United States, Tables and Figures for 2012*, February 2016. Available at: http://www.epa.gov/osw/nonhaz/municipal/msw99.htm.
[26] Ibid.
[27] Ibid.

Figure 3. Categories of Products Discarded in the Municipal Solid Waste Stream, Tons (millions)




Taking a closer look at container and packaging category the in terms of material types discarded, plastic packaging and paper and paperboard packaging comprise the two largest packaging material types, at roughly one third and one quarter of the total packaging discarded, respectively, as shown in Figure 4.

Figure 4. Packaging Products Discarded in the MSW Stream, by Material Type (Tons, millions)




When looking at the containers and packaging category as a proportion of the disposed municipal waste stream, the U.S. EPA estimates the category to comprise about 22 percent of the total disposal MSW disposed. Material types are broken out into glass, steel, aluminum, paper and paperboard, plastics, wood, and other miscellaneous[28]. Some product-level data is collected within those material categories.

[28] Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2012, U.S. Environmental Protection Agency. Accessed at: http://www.epa.gov/osw/nonhaz/municipal/pubs/2012_msw_fs.pdf

The data indicate that plastic packaging represents about a third of the total containers and packaging that is discarded, followed by paper and paperboard. Together, these two packaging subcategories comprise over 57 percent of all the containers and packaging discarded annually.

***Packaging Materials and Products in California's Disposal Stream***

CalRecycle conducts comprehensive waste characterization studies to identify and track materials disposed from all sectors (e.g., residential, commercial) in California. This is done by sorting and weighing materials at facilities throughout the state. Data is tracked primarily by material type (e.g., paper, glass, metal, electronics, plastic, other organic, inerts and other, household hazardous waste, special waste, and mixed residue). The most current waste characterization data is from 2008[29], although a new study is now underway and is anticipated to be completed by mid-2015.

Efforts have been made over the years to track specific products that relate to programs the department directly administers and/or oversees as well as those that have been identified as emerging issues, often garnering interest from the State Legislature. However, this cannot be done consistently for all or most products as the more granular the detail of products in the disposal stream, the higher the cost to conduct the waste characterization study.

To estimate packaging disposal in California, staff combined packaging-specific data with data from the more general material types that primarily reflect packaging products and then grouped by material type. It is important to note that the metal and glass packaging totals are comprised of well-defined packaging products (i.e., clear glass bottles and containers, other colored glass bottles and containers, etc.). For the paper and plastic categories below, the respective subcategory definitions were not as discrete between packaging and non-packaging products, therefore, they also include some number of non-packaging products. However, they were included in the totals because the subcategory definitions indicated a significant portion of packaging materials. See Table 7 for the list of material types, products, and respective disposal tonnage that were included in the total packaging disposal estimate.

Table 7. Packaging Materials in California's Disposed Waste Stream

| Material Type | CalRecycle Waste Characterization Definition | Est. Tons |
|---|---|---|
| **PAPER** | | |
| Uncoated corrugated cardboard | Usually has three layers. The center wavy layer is sandwiched between the two outer layers. It does not have any wax coating on the insider or outside. Examples include entire cardboard containers, such as shipping and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. This type does not include chipboard boxes such as cereal and tissue boxes. | 1,905,897 |
| Paper bags | Means bags and sheets made from kraft paper. The paper may be brown (unbleached) or white (bleached). Examples include paper grocery bags, fast food bags, department store bags, and heavyweight sheets of kraft packing paper. | 155,848 |
| Other miscellaneous paper | Means items made mostly of paper that do not fit into any of the other paper types. Paper may be combined with minor amounts of other materials such as wax or glues. This type includes Items made of chipboard, ground wood paper, and deep-toned or fluorescent dyed paper. Examples include cereal and cracker boxes, unused paper plates and cups, goldenrod colored paper, school construction paper, butcher paper, milk cartons, ice cream cartons and other | 1,202,354 |

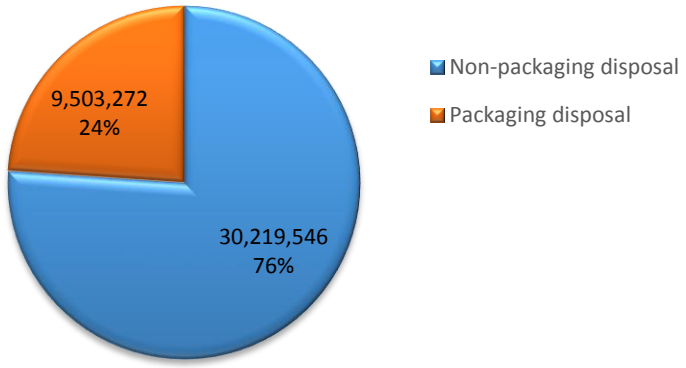
[29] California Integrated Waste Management Board, California 2008 Statewide Waste Characterization Study, August 2009. Available at: http://www.calrecycle.ca.gov/Publications/Documents/General/2009023.pdf

| | | |
|---|---|---|
| | frozen food boxes, pulp paper egg cartons, unused pulp paper plant pots, and hard cover and soft cover books. | |
| Remainder/composite paper | Means items made mostly of paper but combined with large amounts of other materials such as wax, plastic, glues, foil, food, and moisture. Examples include waxed corrugated cardboard, aseptic packages, plastic-coated paper milk cartons, waxed paper, tissue, paper towels, blueprints, sepia, onion skin, fast food wrappers, carbon paper self-adhesive notes, and photographs. | 2,056,546 |
| | **Total Paper Packaging:** | **5,320,645** |
| **GLASS** | | |
| Clear glass bottles and containers | Means clear glass beverage and food containers with or without a CRV label. Examples include whole or broken clear soda and beer bottles, fruit juice bottles, peanut butter jars, and mayonnaise jars. | 196,093 |
| Green glass bottles and containers | Means green-colored glass containers with or without a CRV label. Examples include whole or broken green soda and beer bottles, and whole or broken green wine bottles. | 79,491 |
| Brown glass bottles and containers | Means brown-colored glass containers with or without a California Redemption Value (CRV) label. Examples include whole or broken brown soda and beer bottles, and whole or broken brown wine bottles. | 108,953 |
| Other colored glass bottles and containers | Means colored glass containers and bottles other than green or brown with or without a CRV label. Examples include whole or broken blue or other colored bottles and containers. | 40,570 |
| | **Total Glass Packaging:** | **425,107** |
| **METAL** | | |
| Tin/steel cans | Means rigid containers made mainly of steel. These items will stick to a magnet and may be tin-coated. This type is used to store food, beverages, paint, and a variety of other household and consumer products. Examples include canned food and beverage containers, empty metal paint cans, empty spray paint and other aerosol containers, and bimetal containers with steel sides and aluminum ends. | 236,405 |
| Aluminum cans | | 47,829 |
| | **Total Metal Packaging:** | **284,234** |
| **PLASTIC** | | |
| PETE containers | Means clear or colored PETE (polyethylene terephthalate) containers. When marked for identification, it bears the number 1inthe center of the triangular recycling symbol and may also bear the letters PETE or PET. The color is usually transparent green or clear. A PETE container usually has a small dot left from the manufacturing process, not a seam. It does not turn white when bent. Examples include soft drink and water bottles, some liquor bottles, cooking oil containers, and aspirin bottles. | 199,644 |
| HDPE containers | Means natural and colored HDPE (high-density polyethylene) containers. This plastic is usually either cloudy white, allowing light to pass through it (natural) or a solid color, preventing light from passing through it (colored). When marked for identification, it bears the number 2 In the triangular recycling symbol and may also bear the letters HDPE. Examples include milk jugs, water jugs, detergent bottles, some hair-care bottles, empty motor oil, empty antifreeze, and other empty vehicle and equipment fluid containers. | 157,779 |
| Miscellaneous plastic containers | Means plastic containers made of types of plastic other than HDPE (high-density polyethylene) or PETE (polyethylene terephthalate). Items may be made of PVC (polyvinyl chloride), LDPE (low-density polyethylene), PP (polypropylene), PS | 163,008 |

| | | |
|---|---|---|
| | (polystyrene), or mixed resins. When marked for identification, these Items may bear the number 3, 4, 5, 6, or 7 in the triangular recycling symbol. Examples include food containers such as bottles for salad dressings and vegetable oils, flexible and brittle yogurt cups, syrup bottles, margarine tubs, microwave food trays, and clamshell-shaped fast food containers. This type also includes some shampoo containers, vitamin bottles, foam egg cartons, and clamshell-like muffin containers. | |
| Plastic grocery and other merchandise bags[30] | Means plastic shopping bags used to contain merchandise to transport from the place of purchase, given out by the store with the purchase. This type includes dry cleaning bags Intended for one-time use. Does not include produce bags. Note: This type was classified under Film Plastic in the original 57 standard material types used in the 1999 Statewide Study and the solid waste characterization database | 123,40S |
| Non-bag commercial and industrial packaging film | Means film plastic used for large-scale packaging or transport packaging. Examples include shrink-wrap, mattress bags, furniture wrap, and film bubble wrap. Note: This type was classified under Film Plastic in the original 57 standard material types used in the 1999 Statewide Study and the solid waste characterization database. | 194,863 |
| Other film | Means all other plastic film that does not fit into any other type. Examples include other types of plastic bags (sandwich bags, zipper-recloseable bags, newspaper bags, produce bags, frozen vegetable bags, bread bags), food wrappers such as candy bar wrappers, mailing pouches, bank bags, X-ray film, metallized film (wine containers and balloons}, and plastic food wrap. Note: This type was classified under Film<br>Plastic in the original 57 standard material types used in the 1999 Statewide Study and the solid waste characterization database. | 554,002 |
| Remainder/composite plastic | Means plastic that cannot be put in any other type. These items are usually recognized by their optical opacity. This type includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, plastic drinking straws, foam drinking cups, produce trays, egg cartons, plastic strapping, foam plates/bowls, and new Formica, vinyl, or linoleum. | 1,104,719 |
| | **Total Plastic Packaging:** | **2,497,420** |
| **WOOD** | | |
| Clean pallets and crates | Means unpainted wood pallets, crates, and packaging made of lumber/engineered wood. | **975,866** |
| | **Total Wood Packaging** | **975,866** |
| | **TOTAL PACKAGING** | **9,503,272** |

[30] California 2008 Statewide Waste Characterization Study, available at: http://www.calrecycle.ca.gov/Publication/Documents/General/2009023.pdf

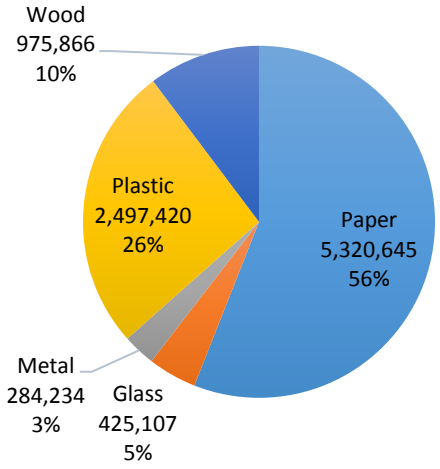
Figure 5. Estimated Packaging Disposal in California (Tons)




Using the data above, Figure 5 illustrates that roughly one quarter of what is currently disposed in California each year is packaging-related. Note that, despite the differences in waste characterization methodologies, the estimated packaging disposal in California is consistent with the U.S. EPA estimate for the container and packaging discarded category from the municipal solid waste stream.

Breaking the data out by material type, paper represents the overwhelming majority of the packaging disposal stream in California, roughly doubling that of plastic packaging disposal. Together, paper and plastic comprise over 90 percent of the total packaging materials disposed. While this percentage includes some portion of non-packaging material due to the inclusion of some more general categories, it is clear that, consistent with U.S.EPA data, paper and plastic are the primary packaging material types in California's disposal stream (see Figure 6).

Figure 6. Estimated Packaging Disposal in California, by Material Type (Tons)

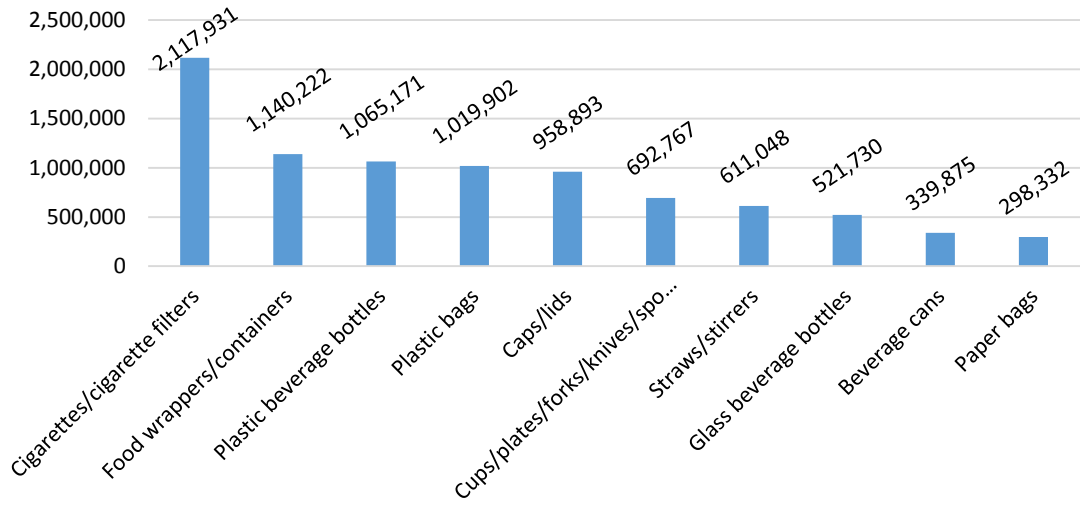



***Packaging Products Found in the Coastal Environment***

Each year the Ocean Conservancy conducts the International Coastal Cleanup Day and provides data on the composition and quantity of materials, by count, collected at beaches all over the world. In 2012

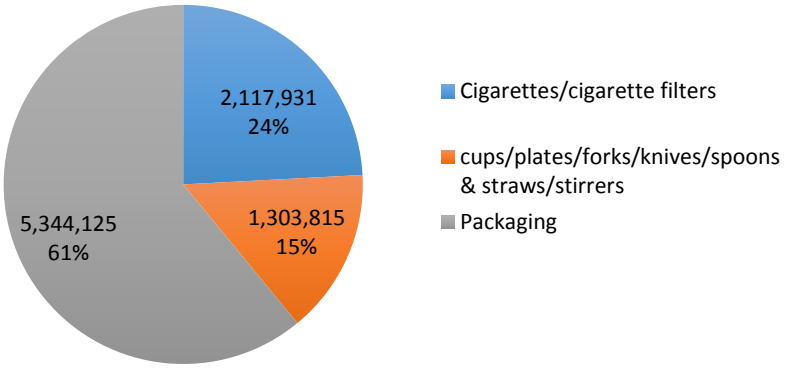
over ten million pounds of trash was collected from nearly 18 million miles of coastline[31]. See Figure 7 for the top 10 items collected at beaches internationally in 2012.

Figure 7. 2012 International Coastal Cleanup Day Top 10 Items Collected (by Count)




For purposes of this exercise, staff identified seven of the top ten items found during beach cleanups are packaging-related (excluded cigarette/cigarette filters, cups/plates/forks/knives/spoons, and straws and stirrers). Figure 8 illustrates the composition of packaging as the most prevalent product category collected at beaches.

Figure 8. 2012 International Coastal Cleanup Data, by Product Type (by count)




[31] http://www.oceanconservancy.org/our-work/international-coastal-cleanup/top-10-items-found-1.html

Appendix 2. End-of-Use Packaging Management Matrix

| | | | | Would Initiatives Impact CalRecycle Packaging-Related Activities?[32] | | | |
|---|---|---|---|---|---|---|---|
| | **Notes on Initiatives** (as described by the entities involved) | **PROs** (relative to addressing packaging in CA's disposal stream) | **CONs** (relative to addressing packaging in CA's disposal stream) | **RPPC** [33] | **BCRP**[34] | **MCR**[35] | **GHG Grant & Loan Program**[36] |
| **Voluntary Initiatives (Examples)** | | | | | | | |
| **Individual company initiatives** | | | | | | | |
| Dell Waste Free Packaging by 2020 | The company will achieve its waste-free packaging goals by 2020 through two avenues:<br>• Ensuring that 100% of Dell packaging is sourced from sustainable materials, including recycled and rapidly renewable content, or material that was formerly part of the waste stream; and,<br>• Ensuring that 100% of Dell packaging is either recyclable or compostable at the end of its life. | • Enables its packaging to enter the recycling stream and not the landfill<br>• Builds on the company's source-reduction efforts | • Does not address ongoing and increasing costs to California's local jurisdictions for actual collection and processing of packaging materials | - | - | X | - |
| **Collective company initiatives** | | | | | | | |
| Closed Loop Fund | The lack of municipal recycling infrastructure as well as capital available to municipalities to invest in infrastructure has caused recycling rates to remain unacceptably low. Proposes to provide municipalities zero interest loans and private firms engaged in public-private partnerships access to capital at below market rates in order to spur investments in municipal recycling programs. Investment period between 2015-2020. | • Acknowledges the private sector need to engage in the financing of packaging recovery at end-of-use<br>• Opportunity to assist local jurisdictions to collect and process more packaging at end-of-use | • A back-end, one-time solution that does not address upstream stakeholders in source reduction, designing for reuse or recycling, or the ongoing technical and market-based challenges associated with a constantly evolving packaging stream<br>• Burden on municipalities to design and implement strategies to address packaging at end-of-use and repay the loans | X | X | X | - |
| The Recycling Partnership | Focuses on curbside programs through infra-structure improvements and strategic outreach. Overseen by Curbside Value Partnership, the project pools Partner dollars to offer communities technical and financial assistance around four key areas: | • Assists local governments (primarily) to serve their residents<br>• Engages members of the packaging value chain in the conversation about increasing recycling | • Back-end solution; does not address upstream stakeholders in source reduction, designing for reuse or recycling, or the ongoing technical and market-based challenges associated with a constantly evolving packaging stream | X | X | X | - |

[32] An "X" indicates potential to impact the associated CalRecycle program. A dash (-) indicates low or no potential to do so.
[33] Rigid Plastic Packaging Container Law: http://www.calrecycle.ca.gov/plastics/rppc/
[34] Beverage Container Recycling Program: http://www.calrecycle.ca.gov/BevContainer/
[35] Mandatory Commercial Recycling: http://www.calrecycle.ca.gov/recycle/commercial/
[36] Greenhouse Gas Grant and Loan Programs: http://www.calrecycle.ca.gov/Climate/GrantsLoans/

| | | | | Would Initiatives Impact CalRecycle Packaging-Related Activities?[32] | | | |
|---|---|---|---|---|---|---|---|
| | **Notes on Initiatives**<br>(as described by the entities involved) | **PROs**<br>(relative to addressing packaging in CA's disposal stream) | **CONs**<br>(relative to addressing packaging in CA's disposal stream) | **RPPC**[33] | **BCRP**[34] | **MCR**[35] | **GHG Grant & Loan Program**[36] |
| | **Access:** Ensuring all households with curbside collection are served by large roll carts.<br>**Champion Building:** Building support from local and state elected officials.<br>**Regional Coordination:** Creating strategy across the entire supply chain, ensuring use of best management practices.<br>**Education and Outreach:** Increasing participation and reducing contamination. | | • Work to initiate in 2014 in the southeastern U.S.; not timeline for efforts to begin in California or the west coast at this time. | | | | |
| **Multi-stakeholder initiatives** | | | | | | | |
| Dialogue on Sustainable Financing of Recycling: Dialogue Report on Consumer Packaging | Sponsored by U.S. EPA in 2010, 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 short-falls 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 in convening and facilitating the dialogue, and assisting stakeholders in developing the contents of a publicly available report with the following major components:<br>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.<br>2. Evaluations of key strategies for financing of systems to recycle packaging from consumer packaged goods as well as printed materials. | • Provided a mechanism for a variety of stakeholders to explore the challenges associated with financing packaging recovery and potential solutions and highlighted the complexity of the topic<br>• Helped to spur the conversation about private sector involvement in packaging recovery | • One-time project; no pathway for direct, ongoing activities<br>• While it contributed to the discussion, no firm commitments were made by participants to act on the recommendations | - | - | - | - |
| **Industry Association initiatives** | | | | | | | |
| AMERIPEN Analysis of Strategies and Financial Platforms to Increase the Recovery of Used Packaging report | Report findings: "…there is significant opportunity to expand certain best practices that are currently under-utilized and highly fragmented. The strategies that hold the most promise for adoption in the U.S. include unit-based pricing/pay as you throw (PAYT) initiatives, disposal bans, and recycling mandates that can collectively help shift | • Engages members of the packaging value chain in the conversation about increasing recycling<br>• Informs stakeholders and decision-makers | • Private sector need to engage in the financing of packaging recovery at end-of-use is not addressed<br>• Many of the recommended approaches require significant local government resources without addressing how they would be funded | | | | |

| | Notes on Initiatives (as described by the entities involved) | PROs (relative to addressing packaging in CA's disposal stream) | CONs (relative to addressing packaging in CA's disposal stream) | Would Initiatives Impact CalRecycle Packaging-Related Activities?[32] | | | |
|---|---|---|---|---|---|---|---|
| | | | | RPPC [33] | BCRP[34] | MCR[35] | GHG Grant & Loan Program[36] |
| | consumer practices away from waste disposal and towards recycling and other recovery strategies."[37] | | | | | | |
| Pac Next Best Practices for Packaging EPR report[38] | Recommends that government and industry collaboratively explore the following series of attributes as a way to reduce packaging waste, influence package design, and increase packaging recovery and recycling:<br>• Covers residential, public, as well as industrial, commercial, and institutional sources<br>• Covers all material types (including printed paper)<br>• Low cost/ton<br>• High collection and recycling rates<br>• High-value materials/high material quality<br>• Program convenience<br>• Full producer responsibility<br>Complimentary policies that were identified included:<br>• Pay-as-you-throw programs<br>• Mandatory recycling requirements<br>• Landfill bans for recyclable materials<br>• Container deposit programs | • Engages members of the packaging value chain in the conversation about increasing recycling<br>• Informs stakeholders and decision-makers | | | | | |
| Association of Postconsumer Plastic Recyclers Grocery Rigid Plastics Recycling Program | There is strong demand for new feedstock to meet the ever-growing demand for recycled resin material. Recyclable rigid plastics, of the type found "behind the counter" in full-line super-markets, provide valuable feedstock to plastics reclaimers and other industry stakeholders. | • Increases recycling of PP and HDPE and availability of PCR feedstock<br>• Aligns with Mandatory Commercial Recycling requirement and progress toward 75% Initiative<br>• Opportunity to decrease waste disposal costs and generate revenue for store | • Not utilized in California at this time | X | - | X | - |
| **Government Initiatives** | | | | | | | |
| Grants & Loans (e.g., CalRecycle) | To date, no grants or loans available specifically for addressing broader packaging issues | • Assists local governments (primarily) to serve their residents, although grants and loans can be tailored to many entities, including businesses, schools, and others.<br>• Can be effective in establishing or expanding local programs and infrastructure | • Money usually comes from fee-, tax-, and rate-payers, businesses, and residents (e.g., landfill tip fees, tire fees) and typically must be authorized through legislation<br>• Funding not always available or in quantities to facilitate meaningful impacts | - | - | - | X |

[37] AMERIPEN Analysis of Strategies and Financial Platforms to Increase the Recovery of Used Packaging, August 27, 2013.

[38] Policy Best Practices that Support Harmonization: Summaries of Eleven Global EPR Programs, Pac Next and Product Stewardship Institute. March 2014.

| | Notes on Initiatives (as described by the entities involved) | PROs (relative to addressing packaging in CA's disposal stream) | CONs (relative to addressing packaging in CA's disposal stream) | Would Initiatives Impact CalRecycle Packaging-Related Activities?[32] | | | |
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| Pay as You Throw (PAYT) | In communities with pay-as-you-throw programs (also known as unit pricing or variable-rate pricing), residents are charged for the collection of municipal solid waste—ordinary household trash—based on the amount they throw away. This creates 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 just like electricity, gas, and other utilities. Households pay a variable rate depending on the amount of service they use. Most communities with PAYT charge residents a fee for each bag or can of waste they generate. In a small number of communities, residents are billed based on the weight of their trash. Either way, these programs are simple and fair. The less individuals throw away, the less they pay.[39] | • Encourages behavior change to recycle as much as possible<br>• Widely acknowledged to be an effective mechanism to increase recycling | | - | X | X | - |
| **Mandatory Initiatives (Examples)** | | | | | | | |
| **Product-specific laws/regulations** | | | | | | | |
| Bans (e.g., OCC, other recyclables) | While Massachusetts, North Carolina, Vermont, and Wisconsin have various disposal bans for glass, steel, and aluminum containers, plastic bottles, and/or various paper types (e.g., old corrugated cardboard, newspaper, magazines, office paper, all recyclable paper).[40], currently there are no packaging product bans in California. | • Can assist other policy mechanisms such as PAYT or mandatory recycling to increase collection and recovery of recyclables<br>Can act as policy driver at the local and state level to increase recovery activities | • Requires government (tax-and rate-payers) resources to enforce | X | X | X | - |
| Minimum recycled content (e.g., California's Rigid Plastic Packaging Container Law) | California's Rigid Plastic Packaging Container Law requires specified containers to meet one of several compliance options, including 25% recycled content. | • Covers a comprehensive set of plastic packaging products<br>• Stimulate markets for postconsumer resin<br>• Enabling legislation and regulations contains requirements supporting consistency among like packaging types<br>• Provides flexibility/options for compliance. | • Some industries report availability of consistent PCM feedstock impacts manufacturing Can be challenging to industry to utilize in some packaging applications<br>• Can be challenging to enforce and requires significant government resources to monitor compliance and enforcement | X | - | - | - |

[39] http://www.epa.gov/osw/conserve/tools/payt/

[40] Research and Analysis of Policies that Drive Increased Recycling, Final Report, by Reclay StewardEdge, Inc. for Carton Council of North America, May 2014.

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|---|---|---|---|---|---|---|---|
| | | | | RPPC [33] | BCRP[34] | MCR[35] | GHG Grant & Loan Program[36] |
| | | | • Law was written in 1991 and does not recognize advancements/changes within the packaging world | | | | |
| EPR | | | | | | | |
| British Columbia approach | • 100% producer-designed, managed, and financed system. Materials collected mainly from single stream/commingled recycling. Includes printed paper.<br>• The British Columbia Packaging and Printed Paper Program rolled out in May 2014<br>• The Recycling Regulation specifies that the PPP stewardship program must achieve, or is capable of achieving within a reasonable time, a 75% recovery rate. | • Covers a comprehensive set of packaging products; enabling legislation contains requirements intended to ensure consistency among like programs, adequate stakeholder consultation, program details, and implementation are clearly and transparently described<br>• Many companies regulated in Canadian provinces such as British Columbia also sell into the U.S.; familiar with general compliance approach | • Because the program began only a few months prior to the drafting of this paper, an evaluation of outcomes is not yet possible<br>• Concerns expressed by stakeholders prior to program implementation included possibility of "stranded assets" for local jurisdictions if their publicly-owned facilities were not utilized in the program and general uneasiness on the part of local jurisdictions of turning over management of materials to the private sector; how rural areas would be served; and how currently unrecyclable materials will be handled (e.g., incineration). | X | X | X | X |
| European Union approach (e.g., Belgium, Germany, Austria, France, Netherlands) [41] | • Materials collected are primarily source-separated. Tend not to include printed paper. | • Covers a comprehensive set of packaging products; enabling legislation sets material-specific recycling targets and allows flexibility for each member country to determine the best way to meet those targets<br>• Source separation results in low contamination and high quality of materials.<br>• According to industry, packaging production and packaging waste disposal have been decoupled from economic growth[42] | • Many programs experience a high percentage of free riders<br>• No definitive link between EPR and green design<br>• Countries with many stewardship organizations/mechanisms to fulfill stewards' obligations, it may be a challenge for oversight entities to keep up with the number of producers and products to ensure compliance | X | X | X | X |
| **Sector-specific laws/regulations (Examples)** | | | | | | | |
| Commercial recycling | The purpose of Mandatory Commercial Recycling (MCR) is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and to expand the opportunity for additional recycling services and recycling manufacturing | • Can help address significant quantities of materials with requirements specific to that particular sector | • In the absence of requirements for other sectors, a single sector-specific law/regulation can only address a portion of the waste stream | X | X | X | X |

[41] Policy Best Practices that Support Harmonization: Summaries of Eleven Global EPR Programs, Pac Next and Product Stewardship Institute. March 2014.

[42] Packaging and Packaging Waste Statistics in Europe 1998-2008: An analysis of official EU data by EUROPEN. EUROPEN 2011.

| | | | | Would Initiatives Impact CalRecycle Packaging-Related Activities?[32] | | | |
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| | facilities in California. MCR was one of the measures adopted in the Assembly Bill 32 Scoping Plan by the Air Resources Board pursuant to the California Global Warming Solutions Act (Chapter 488, Statutes of 2006). The MCR Measure focuses on increased commercial waste diversion as a method to reduce GHG emissions. It is designed to achieve a reduction in GHG emissions of 5 million metric tons of carbon dioxide (CO2) equivalents. To achieve the measure's objective, an additional 2 to 3 million tons of materials annually will need to be recycled from the commercial sector by the year 2020 and beyond. | | | | | | |
| Residential recycling | The California Integrated Waste Management Act made all California cities, counties, and approved regional solid waste management agencies responsible for enacting plans and implementing programs to divert 25 percent of their solid waste by 1995 and 50 percent by year 2000, and to maintain that. Later legislation mandates the 50 percent diversion requirement be achieved every year in subsequent years. | • Can help address significant quantities of materials with requirements specific to that particular sector | • In the absence of requirements for other sectors, a single sector-specific law/regulation can only address a portion of the waste stream | X | X | X | X |