
A Review of California and Maine's electronics recycling programs

Introduction

California and Maine were the first US states to pass laws that established a mechanism for financing the collection and recycling of discarded electronics, commonly known as electronic waste or "e-waste." Certain electronics can be classified as hazardous waste at the point of disposal,^a as defined under the federal Resource Conservation and Recovery Act (RCRA).¹ California and Maine's laws were created to prevent these types of electronics from being sent to solid waste disposal facilities. This fact sheet compares the different approaches taken in each state and provides preliminary statistics of each program.

Product Coverage and System Design

California

Product coverage. On February 3, 2003, California classified a cathode-ray tube (CRT), which can be used for televisions and computer monitors, as universal waste,^b and it prohibited them from being sent to solid waste disposal facilities.² In September, California's Electronic Waste Recycling Act of 2003^c became the first law in the US to establish a system for financing the collection and recycling of certain discarded electronics.³ The electronics covered by the act are video display devices (e.g., computer monitors and televisions) with a screen size greater than 4 inches diagonally, including devices containing a CRT, a liquid crystal display (LCD), or plasma display, and all are classified as universal waste.^d

System design. On January 1, 2005, retailers in California started to collect a \$6, \$8, or \$10 fee at the point of sale from consumers to fund the collection and recycling of covered electronics discarded from households. Fees are based on screen size measured diagonally, \$6 for screens greater than 4 inches and less than 15 inches, \$8 for screens equal to or greater than 15 inches and less than 35 inches, and \$10 for 35 inches and larger. The fee charged to consumers at the point of sale is termed an Advanced Recycling Fee (ARF).

Approximately 20,000 retailers are registered to sell these devices in California, and they operate approximately 28,500 retail outlets. Of the 32 Internet retailers rated highest in terms of sales, 20 are registered to collect the fees; companies such as eBay and Amazon are not registered as California retailers and are not required to collect the fees.⁴

Retailers transfer the collected fees to the Board of Equalization (BOE), which in turn deposits the money into an account managed by the California Integrated Waste Management Board (CIWMB). CIWMB distributes the funds from this account in two ways: (1) as a legally set fixed rate (\$0.28/lb for recycling and \$0.20/lb for collection), given to approved recyclers, or (2) as a payment equal in value to the ARF paid for the device, given to registered manufacturers that are collecting and recycling. If these recovery or recycling payments do not fully cover costs, collectors and recyclers may charge fees; however, the collector must offer a cost-free collection method even if they charge the consumer for recovery under another method.

^a A hazardous waste exhibits at least one of four characteristics: ignitability, corrosivity, reactivity, or toxicity. During the US EPA's Toxicity Characteristic Leachate Procedure (TCLP), which simulates landfill conditions, certain electronics exhibit hazardous characteristics.

^b Universal wastes are hazardous wastes that can be managed under less stringent requirements than other hazardous wastes but may not be discarded in solid waste landfills in California. Other products classified as universal waste in California include electronic devices—computers, printers, VCRs, cell phones, telephones, radios, and microwave ovens; batteries; fluorescent tubes and bulbs; mercury-containing devices; and non-empty aerosol cans that contain hazardous materials.

^c SB 20 (Chapter 526, signed into law on September 25, 2003) and SB 50 (Chapter 863, signed into law on September 29, 2004).

^d Devices will not be subject to a fee if, when discarded, they would not be classified as a hazardous waste in the state of California.

To be eligible for recovery, recycling, or manufacturer payments, covered electronics must be discarded from households in California. Recyclers must have source documentation to show that covered electronics originated from California. Because covered electronics can come from within the state, outside the state, residential sources, and nonresidential sources or be source-anonymous, collectors are subject to source documentation requirements.

Covered electronics intended for reuse are not eligible for recycling payments. To eliminate the possibility of double payment, payment for recycling electronics is possible only with the cancellation methods^e described in the final regulations.⁵

Reimbursements from CIWMB also offset the collection costs incurred by local jurisdictions or other authorized collectors.^f These reimbursements are provided as waste recovery payments made at a fixed rate of \$0.20/lb, and are distributed through the approved recyclers. As of September 2006, 461 collectors and 49 recyclers were approved by CIWMB.⁶ CIWMB will approve only those recyclers located in the state.

Maine

Product coverage. On April 22, 2004, Maine's Electronics Waste Law became the second law in the US to establish a system for financing the collection and recycling of discarded electronics.⁷ As in California, the covered electronics are video display devices with a screen size greater than 4 inches diagonally. On July 20, 2006, the state prohibited households from sending CRTs to solid waste disposal facilities; municipalities must ensure that they are recycled, choosing from one of the consolidators approved by Maine's Department of Environmental Protection (DEP).

System design. On January 18, 2006, manufacturers became responsible for paying the collection and recycling costs of (1) covered electronics that are discarded from households and that they have produced under their own brand labels and (2) a pro rata share of electronics that are considered orphans.^g

150 manufacturers are participating in the program.⁸ Their funding responsibility begins when the consolidator^h receives the electronics and lasts through the recycling of the equipment. Maine's DEP manages the approval process for consolidators that make contractual arrangements with local jurisdictions that collect covered electronics from households. Each year, DEP evaluates the approved consolidators list, and it may revise this list to include consolidators that submit the lowest cost schedules. As of December 2006, DEP has approved five consolidators.

Depending on the arrangements made with manufacturers, consolidators bill individual manufacturers for allowable costs (not to exceed \$0.48/lb)ⁱ based on the products they receive, or they separate the manufacturer's product (or its share of mixed brand products), which is shipped to the manufacturer's contracted recycler.⁹ If the manufacturer's product is physically separated, the cost is borne by the manufacturer that requests the service. Consolidators must track data on the brands and volumes collected from each manufacturer. Every year, consolidators must also submit to DEP a report that identifies the brand and weight of each covered device collected from households and provides information about rates of reuse and recycling.

Local jurisdictions must ensure that covered electronics are delivered to a consolidation facility,^j and units discarded by residents must be clearly marked with the notation "MH" to indicate that they came from Maine households. The entity that delivers covered electronics to the consolidator bears the costs for units that are delivered without the MH notation. To minimize their costs, municipalities can charge a minimal end-of-life fee. (If any municipality charges this type of fee, it is relatively low.¹⁰)

^e "Cancellation" ensures that the covered electronic device is dismantled or destroyed.

^f An authorized collector can be a city, county, or district or an entity under contract; a nonprofit organization; a manufacturer or agent of the manufacturer; or any entity filing notification with DTSC. Payment to a manufacturer that takes back and recycles a covered device from a consumer is equal to the value of the fee paid for that device.

^g An "orphan" is a product whose manufacturer cannot be identified, is no longer in business, or has no business successor.

^h A person that provides collection and handling services and operates at least one consolidation facility.

ⁱ Overall allowable costs cover the handling, transportation to a recycling facility, and recycling of used electronics.

^j The facility where discarded electronics are consolidated until enough of them are collected to fill a 40-foot trailer. The facility can also be a transport vehicle.

Accessibility, Public Education, and Collection Amounts

California

Accessibility. Authorized collectors are required to provide a free and convenient system for collecting, consolidating, and transporting used electronics discarded in California.¹¹ No data are yet available on the geographic areas where take-back is available or how accessible these programs are. Local jurisdictions cannot send covered electronics to a solid waste disposal facility; therefore, each will have a provision to collect them separately.

Education. The law requires manufacturers to provide consumers with information that describes where and how to dispose of covered electronics.

Collection amounts. In 2005, the first year of the program, 64.8 million lbs were collected. In a state with a population of 36 million people, this figure translates into a collection rate of 1.8 lbs/capita. In 2006, 114.5 million lbs (3.1 lbs/capita) were collected.¹² Although the law does not impose collection targets, CIWMB will annually establish recycling goals and report on the amounts of covered electronics sold in the state and the amounts recycled.

Maine

Accessibility. Municipalities are responsible for delivering covered electronics to a consolidation facility. Therefore, they can choose to operate a collection center, provide regular one-day collections, or have residents take used equipment directly to a consolidator.

Education. The law requires manufacturers to offer public education to inform the public about the collection system.

Collection amounts. During the first 5 months of 2006, 1.3 million lbs of covered electronics were collected,¹³ which equals a rate of 2.4 lbs/capita, if annualized, in a state with a population of 1.3 million people. Of this total, approximately 1.5–2.5 percent of televisions and 15 percent of computer monitors were orphans that were shared.¹⁴ The law does not impose collection targets. Starting July 1, 2007, manufacturers will have to provide an annual report that identifies the quantities of televisions and computer monitors sold and collected in the state, a capture rate based on sales, and percentages that are reused and recycled from what is collected.

System Cost and Financial Reserve

California

System cost. Collectors and processors have reported costs of \$0.19/lb and \$0.27/lb, respectively, for a total of \$0.46/lb. Management costs total \$10.5 million or \$0.29/capita.^{15,16}

A percentage of the revenues generated by the ARF are divided among BOE, CIWMB, and the Department of Toxic Substances Control (DTSC) to cover management costs. Another percentage goes to providing consumer education. Retailers retain 3 percent of the ARF to cover their costs associated with collecting it. In fiscal year (FY) 2006, \$2.2 million went to retailer reimbursement, and \$3.8 million went to BOE for the administrative cost of fee collection.^{17,18}

Financial reserve. During the first 18 months of the program, \$109 million was collected,¹⁹ and processors claimed \$57.5 million.²⁰ An estimated \$15.7 million went to administration in that period, generating an estimated program surplus of \$35.8 million; however, this surplus could be reduced by continual growth in processor claims or in claims processors submit several months after collection has occurred. The law states that ARFs must be reviewed and adjusted, if necessary, to ensure the funds can cover the cost of collection and recycling. Yet the law does not stipulate how much money must be retained in the financial reserve.^k Separate from financial reserves for collection and recycling, the law specifies only that the revenues in the account should be sufficient to fund administration, enforcement, and promotion and that the reserve cannot exceed 5 percent the total amount in the account.

^k The surplus that remains after the collected fees cover operating costs.

Maine

System cost. As of October 2006, the five approved consolidators reported total consolidation and processing costs that range between \$0.19/lb and \$0.38/lb. Management costs came to \$207,500 or \$0.16/capita.²¹ The costs to DEP are from checks on compliance and processing standards and some education and outreach.

Financial reserve. This system has no financial reserve because processors charge manufacturers directly for the cost of recycling used equipment.

Handling and Recycling of Collected Electronics

California

CIWMB can audit approved collectors and recyclers to determine compliance, and they must maintain records on revenues (e.g., fees charged, revenues from commodity sales) and specific costs related to their business. CIWMB will use these reports to adjust future recovery and recycling payment rates.²²

Recyclers must operate in accordance with all federal, state, and local laws. They must also meet the following requirements set forth in regulations²³ that, among others, include undergoing annual inspections by DTSC, showing proof of certified environmental compliance plans, maintaining the bills of lading for treated residuals,¹ and demonstrating that materials are not ultimately disposed to land, water, or air.²⁴ After following one of the cancellation methods described in the final regulations, DTSC requires notification and documentation from recyclers before the export of materials for recycling in other countries.

Maine

Recyclers that receive covered devices from consolidators must provide a sworn certification that they follow Maine's Guidelines for the Environmentally Sound Management of Televisions and Computer Monitors.²⁵ These guidelines require recyclers to adhere to a documented environmental management system, conduct environmental health and safety audits, show due diligence when selecting recycling facilities, visibly track through bills of lading to destination facilities, and track inbound and outbound material weights sent to each destination. Recyclers must also operate in accordance with all federal, state, and local laws. Contractual arrangements with the recipient must be made in advance before exporting discarded electronic devices to other countries; these arrangements must describe the quantity and nature of materials being exported. If the exported products are intended for reuse, they must be whole and tested to show they are in working order.

Promotion of Environmentally Conscious Design

California

Certain substances in electronics pose threats after combustion in incinerators and disposal in landfills. Effective January 1, 2007, the state prohibits the sale of covered devices that would not be eligible for sale in the European Union (EU) under the EU's Reduction of Hazardous Substances (RoHS) Directive.²⁶ RoHS regulates the content of certain hazardous substances in some electronic devices by setting maximum concentration values by weight of each homogeneous material for lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, and polybrominated diphenyl ethers.

Each manufacturer must submit an annual report to the CIWMB that lists the amounts of covered electronics sold in the state by brand; estimated amounts, in milligrams, of mercury, cadmium, lead, hexavalent chromium, and polybrominated biphenyls used in the electronics; and estimated amounts of recyclable materials (e.g., plastics, glass, and metals) contained in the electronics. This report must also provide information about how the manufacturer is designing its products for recycling (e.g., ease of disassembly, resin identification, and more efficient use of materials by reducing the amount of hazardous substances used or taking other approaches). Manufacturers can fulfill this requirement by submitting a collective report.

¹ Materials that result from the dismantling or recycling of a covered electronic device.

As specified in the law, a working group was convened to identify environmental purchasing criteria for state agencies that would consider environmental impacts and promote the development of environmentally conscious products. The board approved the Electronic Product Environmental Assessment Tool (EPEAT)²⁷ as the criteria that can be used to identify devices with reduced environmental impacts.

Maine

The law does not require RoHS Directive compliance for covered devices sold in the state. By making manufacturers financially responsible for managing discarded electronics, Maine's law encourages them to continually improve products so that they are easier and cheaper to recycle. As a way to measure the improvement, processing facilities have to report to DEP on the percentage of devices sent for reuse, the percentage of components recovered for reuse, the percentage of materials recycled, rates of residual from recycling by material, and the fate of materials not recycled.²⁸ The law requires manufacturers to submit a report that describes their plans for taking additional or alternative actions to improve recovery and recycling rates.²⁹ Electronic devices that incorporate design for the environment will be given purchasing preference in state procurement contracts.³⁰

Summary

Although both laws cover the same products, the states take different approaches for financing their collection and recycling. While California has consumers pay upfront fees, which 8,000–9,000 retailers remit regularly to BOE,³¹ consolidators in Maine receive financing from approximately 150 manufacturers that own the brands returned within the state.

Both states have a sales ban for manufacturers that do not comply with the law. Both states also ban the disposal of covered devices in solid waste facilities, which places responsibility on local jurisdictions for ensuring that collection is taking place.

Reported costs for collecting and processing covered products in California are \$0.46/lb, compared to a range of \$0.19/lb to \$0.38/lb in Maine. Management costs per capita for the fee-based system in California (\$0.29 per capita) are nearly twice as much as the Maine system (\$0.16 per capita). Because only \$57.5 million of the collected ARF was claimed after 18 months of program operation, California built a financial reserve of an estimated \$35.8 million, after factoring in administration costs. Based on program operation costs thus far, the fees collected seem to have no apparent relationship to the actual amounts of electronics collected and recycled in California; therefore, costs borne by consumers do not seem to be justified. However, continual growth in processor claims may reduce this fund surplus. In Maine, financing covers the actual operational costs of the program because the system is based on the actual weight of the electronics returned. The market-based rates paid for the actual weight of returns do not create a monetary reserve.

Both states require verification to show that covered devices were disposed within the state versus out of state. They also have similar reporting requirements for processors.

Concerning the promotion of environmentally conscious design, California has a number of approaches that include hazardous substance bans and reporting requirements to track manufacturer progress and purchasing criteria (EPEAT) for state agencies. Maine has reporting requirements for processing facilities, and state agencies will take advantage of the EPEAT program. Also, by making manufacturers directly responsible for financing the collection and recycling of covered products, Maine encourages manufacturers to make continual design improvements so products are easier and cheaper to recycle, helping create a more resource-efficient process.

Other State Laws or Model Legislation

- Washington, Electronic Product Recycling Law, Chapter 70.95N RCW, available at <http://www.ecy.wa.gov/programs/swfa/eproductrecycle>
- Maryland, Statewide Computer Recycling Pilot Program, available at <http://mlis.state.md.us/2005rs/bills/hb/hb0575t.pdf>

- Council of State Governments/Eastern Regional Conference (CSG/ERC) and the Northeast Recycling Council, Inc. (NERC), An Act Providing for the Recovery and Recycling of Used Electronic Devices, available at <http://www.csgeast.org/enrgwaste.asp>
- Midwest Regional Electronic Waste Recycling Policy Initiative, available at <http://www.moea.state.mn.us/stewardship/electronicmidwest.cfm>

Sources

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- ² California Department of Toxic Substances Control, "Final Text of Regulations, Electronic Hazardous Waste," R-01-06, available at http://www.dtsc.ca.gov/LawsRegsPolicies/Regs/upload/Oeara_regs_crttext.pdf.
- ³ California Integrated Waste Management Board, "Electronic Waste Recycling Act of 2003," available at <http://www.ciwmb.ca.gov/Electronics/Act2003>.
- ⁴ National Electronics Recycling Infrastructure Clearinghouse, Meeting with California Integrated Waste Management Board and Board of Equalization, August 2006, available at <http://www.ecyclingresource.org/UserDocuments/NCER%20CA%20Trip%20Report%209-1-06.doc>.
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- ⁶ California Integrated Waste Management Board, "Update on the Implementation of the Electronic Waste Recycling Program in California," September 2006.
- ⁷ Office of the Revisor of Statutes, Title 38: Waters and Navigation, Chap. 16: Sale of Consumer Products Affecting the Environment, available at <http://janus.state.me.us/legis/statutes/38/title38sec1610.html>.
- ⁸ Carole Cifrino, "Maine's E-Waste Law: Is It Working?" Presentation at E-scrap 2006, Austin, TX, October 19, 2006.
- ⁹ Maine Department of Environmental Protection, "Maine Solid Waste Management Rules," Chapter 415: Reasonable Costs for the Handling and Recycling of Electronic Wastes, November 13, 2005, available at <http://www.maine.gov/sos/cec/rules/06/096/096c415.doc>.
- ¹⁰ Cifrino, "Maine's E-Waste Law."
- ¹¹ California Integrated Waste Management Board, "Electronic Waste Recycling Act of 2003."
- ¹² Personal communication with Shirley Willd-Wagner, California Integrated Waste Management Board, February 2007.
- ¹³ Personal communication with Carole Cifrino, Maine Department of Environmental Protection, February 2007.
- ¹⁴ Personal communication with Carole Cifrino, Maine Department of Environmental Protection, November 2006.
- ¹⁵ California State Board of Equalization, 3-Year Expenditures and Positions, available at <http://www.ebudget.ca.gov/pdf/GovernorsBudget/0010/0860.pdf>
- ¹⁶ Jeremy Gregory and Randolph Kirchain, *A Comparison of North American Electronics Recycling Systems*, Cambridge, MA: MIT Materials Laboratory, October 2006.
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