

Oregon E-Cycles Biennial Report

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State of Oregon
Department of
Environmental
Quality



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Executive Summary

This report fulfills DEQ's requirement to submit a biennial report to the Legislature on the operations of Oregon E-Cycles under Oregon's Electronics Recycling Law, ORS 459A.340(8). The full 2012 Oregon E-Cycles Biennial Report is available at: www.deq.state.or.us/pubs/legislativepubs/

Oregon's Electronics Recycling Law, adopted in 2007, established a product stewardship program¹ for electronics, Oregon E-Cycles. The law requires electronics manufacturers to provide free, convenient, statewide recycling for computers, monitors and TVs. Amendments in 2011 added printers and computer peripherals beginning 2015. Manufacturers selling devices into Oregon must register their brands with DEQ and join either the state contractor or a manufacturer-run recycling program. Each program operates under a plan approved by DEQ and is funded by its participating manufacturers.²

Retailers may sell into Oregon only registered brands of manufacturers in compliance with the law. They must also inform consumers about recycling opportunities under Oregon E-Cycles.

The law also bans computers, monitors and TVs from disposal at solid waste disposal facilities.

Oregon E-Cycles has produced significant environmental benefits since operations began in 2009. Each year the weight of devices recycled and the number reused has increased, exceeding statewide recycling goals. Preliminary figures show nearly 26 million pounds of devices were recycled and another 36,700 units were reused through Oregon E-Cycles during 2011 alone. Since 2009, Oregon E-Cycles recycling has saved approximately 1,050 billion BTUs of energy, which equates to approximately 8 million gallons of gasoline. Net greenhouse gas reductions are estimated at 80,000 metric tons of carbon dioxide equivalent, comparable to the benefit of eliminating tailpipe emissions from approximately 16,300 average passenger cars per year.

Four recycling programs have comprised Oregon E-Cycles operations since its inception: a state contractor program operated by a private entity under a contract with DEQ, and three manufacturer-run recycling programs. Combined, these four programs include more than 160 manufacturers and use about eight recyclers.

Each recycling program must ensure the collectors and recyclers in its network comply with approved standards and practices. The programs must also verify that devices are

¹ Product stewardship is an environmental management strategy in which all parties involved in the design, production, sale and use of a product take responsibility for minimizing the product's environmental impacts throughout all stages of the product's life.

² Manufacturers in the state contractor program pay recycling fees to DEQ to cover that program's costs. Manufacturers in manufacturer-run programs pay according to their program agreements.

managed appropriately from the initial recycler through the point at which materials are processed into single-stream commodities. In its oversight role, DEQ reviews program reports and addresses any issues with the recycling programs. In 2011, DEQ also conducted oversight visits at 20 percent of Oregon E-Cycles collectors across the state and at all in-state recycling facilities. DEQ identified some concerns regarding facility operations and is following up with the recycling programs to ensure improvement. Based on these results, DEQ will conduct fewer but more targeted visits in 2012.

Although Oregon E-Cycles recycling programs change slightly every year, the four programs have established a stable recycling infrastructure with more than 220 collection sites and additional events statewide.

Oregon E-Cycles is a successful product stewardship program where stakeholders have worked cooperatively to provide convenient, responsible recycling for the growing electronics waste stream. The program has significantly expanded opportunities for Oregonians to recycle electronic wastes and has shifted responsibility and costs for managing this waste from rate payers and local governments to product manufacturers, sellers and users. DEQ will continue to work with recycling programs, the E-Cycles advisory workgroup and other interested parties to evaluate and improve the Oregon E-Cycles program.

Overview

Purpose

This is DEQ's biennial report to the Legislature on the operations of Oregon's electronics recycling program – Oregon E-Cycles – as required under Oregon's Electronics Recycling Law, ORS 459A.340(8).

Oregon's Electronics Recycling Law

Oregon's Electronics Recycling Law, adopted in 2007, established a product stewardship program for electronics recycling, Oregon E-Cycles. The law requires electronics manufacturers to provide free, convenient, statewide recycling for computers, monitors and TVs. Manufacturers whose covered devices are sold in or into Oregon must register their brands with DEQ and join either the state contractor recycling program or a manufacturer-run recycling program. These programs are funded by their participating manufacturers.

Each recycling program establishes a statewide network of sites and services to collect and recycle covered devices under a plan approved annually by DEQ. The plan must provide at least one collection site in every city with a population of 10,000 or more and convenient service (e.g., sites, events, mail back) in every county. The plan must also ensure its collectors, transporters and recyclers follow environmentally sound management practices, and provide inspections and audits to verify compliance from collection through final processing. DEQ oversees compliance with the plans.

Each year DEQ determines the total weight of computers, monitors and TVs expected to be recycled in the state the following year and assigns each manufacturer a portion of that total weight as its minimum recycling obligation (called return share by weight) for the coming year.³ Manufacturer recycling programs must recycle at least the total return share weight of their participating manufacturers to avoid penalties, but must collect and recycle year-round under their plans, even if they exceed that amount. Recycling programs must also regularly advertise and promote collection opportunities statewide.

Any person may drop off up to seven computers, monitors and TVs at a time at a collection site free of charge. Households and small non-profit organizations and businesses may recycle any amount without charge.

Retailers and manufacturers may sell a covered electronic device in or into Oregon only if it has a currently registered brand affixed to the device, and the brand manufacturer is

³ Return shares and return shares by weight are based on the percentage of each manufacturer's computers, monitors and TVs **returned for recycling** through the E-Cycles program the previous year, as determined through sampling those returns. For TV manufacturers only, that total return share weight for all TV manufacturers is then reallocated among individual TV manufacturers based on their respective market share of TVs **sold in or into** Oregon the previous calendar year to determine their final return share by weight. TV manufacturers are those making more TVs than computers and monitors in any given year.

on DEQ's list of manufacturers currently in compliance with the Electronics Recycling Law. Retailers must also inform consumers purchasing covered electronic devices about recycling opportunities under Oregon E-Cycles.

The law also banned computers, monitors and TVs from disposal at solid waste disposal sites after January 1, 2010.

In 2010 the Legislature amended the Electronics Recycling Law (House Bill 3606) to change the method for calculating the return shares by weight (minimum recycling obligations) for TV manufacturers. The collective weight of all TV manufacturers' devices returned for recycling is redistributed among TV manufacturers based on their respective market share of TVs sold in Oregon the previous year.

Amendments in 2011 (Senate Bill 82) added printers and computer peripherals (keyboards, mice and associated cords) to Oregon E-Cycles beginning January 2015. These devices were not included in the disposal ban for other covered electronic devices. SB 82 also established a recycling credit system that allows recycling programs to claim the pounds they collect over their minimum recycling obligation in any year as recycling credits that can be sold or used in future years to meet up to 15 percent of a program's minimum recycling obligation.

Oregon E-Cycles Implementation

Program Performance

Oregon E-Cycles began collecting and recycling computers, monitors and TVs in January 2009, and completed its third year of operations in December 2011. Table 1 summarizes program performance since 2009.

| | 2009 | 2010 | 2011 | Totals |
|---|-----------------|-----------------|---------------------------|---------------|
| Recycling and Reuse | | | | |
| <i>Statewide recycling goal (pounds)</i> | 12.2 million | 21.5 million | 23 million | 66.7 million |
| <i>Total recycled (pounds)</i> | 19.0 million | 24.2 million | 25.9 million ^a | 69.1 million |
| <i>Per capita recycled (pounds)</i> | 4.96 lbs | 6.3 lbs | 6.75 lbs ^a | |
| <i>Units reused</i> | 25,900 | 38,000 | 36,007 ^a | 100,600 |
| Recycling Programs | | | | |
| <i>Plans</i> | 3 mfr + 1 state | 3 mfr + 1 state | 3 mfr + 1 state | |
| <i>Participating manufacturers</i> | 176 | 162 | 169 | |
| Services | | | | |
| <i>Collection sites</i> | ~ 220 | ~240 | ~230 | |
| <i>Collection events</i> | 22 | 17 | 13 | |
| <i>Recyclers</i> | 6 | 6 | 8 | |
| Energy Savings/ Greenhouse Gas Reductions | | | | |
| <i>Energy savings (BTUs)</i> | 290 billion | 370 billion | 390 billion | 1,050 billion |
| <i>(equivalent gallons of gas)</i> | (2 million) | (3 million) | (3 million) | (8 million) |
| <i>GHG emission reductions (metric tons CO₂E)</i> | 22 ,000 | 28 ,000 | 30,000 | 80,000 |
| <i>(equivalent tailpipe emissions, cars/year)</i> | (4,500 cars) | (5,700 cars) | (6,100 cars) | (16,300 cars) |

^aPreliminary 2011 figures; final 2011 figures available March 2012.

Recycling and Reuse

DEQ has increased the goal for statewide recycling each year based on past years' recycling, per capita recycling trends in states with comparable programs, and other factors. For example, DEQ has considered the 2009 switch to digital TVs, 2010 disposal ban, promotional efforts, sales of covered electronics and light-weighting of covered electronics when setting recycling goals. The statewide recycling goal for 2012 is 27.05 million pounds of computers, monitors and TVs, which is 7.1 pounds per capita.

The weight of electronic devices recycled and number reused has increased each year since the Oregon E-Cycles program began. This reflects an increasing demand for these services. Preliminary figures show nearly 26 million pounds of electronic devices were recycled and another 36,727 units were reused in Oregon during 2011. The weight of electronics recycled per capita has also increased each year.

Even if demand for electronics recycling continues to increase, DEQ will evaluate relevant trends and information and consult with stakeholders each year to determine whether the total *weight* of recycling – and thus the statewide recycling goal for E-Cycles – should also increase. As the mix and weight of devices returned for recycling changes (e.g., fewer old, heavy TVs and computers and more, lighter-weight flat screens, laptops and net books), the total weight of electronics recycled each year may stabilize or even decline.

Recycling Programs

Four recycling programs have comprised Oregon E-Cycles operations since its inception:

- A state contractor program operated by the National Center for Electronics Recycling under a contract with DEQ
- Three manufacturer-run recycling programs:
 - Electronic Manufacturers Recycling Management Company
 - Manufacturers' Group Program
 - Individual Producer Responsibility group plan

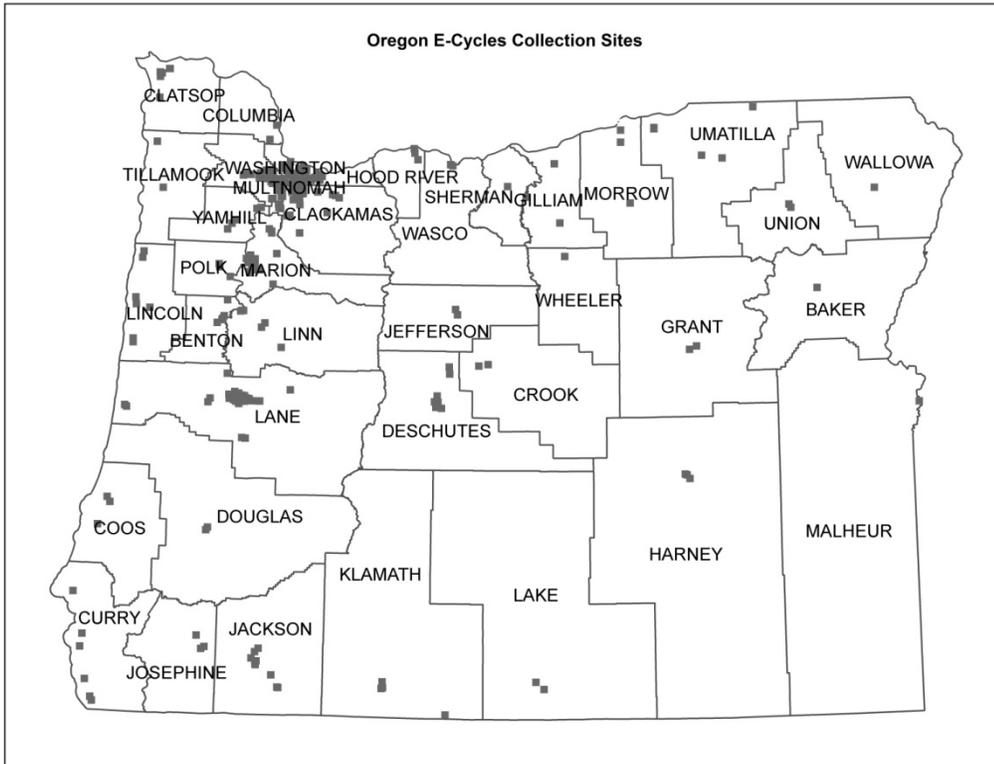
Combined, these four programs include more than 160 manufacturers.

Services

Although Oregon E-Cycles recycling programs undergo some change every year (e.g., participating manufacturers, minimum recycling obligations and collection and recycling networks), collectively the four programs have established a fairly stable recycling infrastructure for Oregon E-Cycles with more than 220 collection sites. The recycling programs must each provide at least the minimum collection service required by the law (service in each county and at least one site for every city with a population of 10,000 or more), but can and do share collection sites. For example, multiple recycling programs may share sites that collect high volumes or are in areas where few are available. Collection sites include public and private transfer stations, landfills, recycling and refurbishment centers, thrift stores and retail locations. Figure 1 provides a map of the

collection sites in Oregon in October 2011. [DEQ's E-Cycles web pages](#) provide a search page and hotline number for locating collection sites and services.

Figure 1: Map of Oregon E-Cycles Collection Sites, October 2011



The four recycling programs collectively used the following eight recyclers during 2011. Each recycling program contracted directly with at least two recyclers and used others through site sharing agreements with the other programs.

- Universal Recycling Technologies, Clackamas, OR
- Waste Management Recycle America, LLC, Tigard, OR
- Total Reclaim Inc, Portland, OR (sends some material to Seattle, WA)
- Free Geek, Portland, OR
- Technology Conservation Group, Portland, OR
- Electronic Collection Services Refining, Santa Clara, CA (consolidation point in Medford, OR)
- IMS Electronics Recycling, Vancouver, WA
- Electronic Recyclers International, Seattle, WA

Environmental Benefits

Recycling waste electronics achieves significant environmental benefits when the recycled materials are used to replace virgin feedstock in manufacturing. Responsible recycling also keeps toxic materials from being released to the environment. To help quantify those benefits, DEQ has used U.S. Environmental Protection Agency models

and emissions factors to estimate both the energy savings and the reductions in greenhouse gases associated with recycling computers, monitors and TVs through the Oregon E-Cycles program since it began in 2009. Those savings are significant.

DEQ estimates E-Cycles recycling has led to energy savings of approximately 1,050 billion British thermal units (BTUs), which is equivalent to approximately 8 million gallons of gasoline. Net greenhouse reductions are estimated at 80,000 metric tons of carbon dioxide equivalents. Using data from EPA, Oregon Department of Transportation and Oregon Department of Energy, DEQ estimates those reductions are comparable to the greenhouse gas benefit of eliminating tailpipe emissions from approximately 16,300 average passenger cars per year.

While the energy and greenhouse gas benefits of recycling are significant, reusing computers, monitors and TVs may produce even greater benefits. Reuse that replaces new products avoids the resource consumption and environmental impacts that occur over the life of a product, from resource extraction, materials processing, manufacture and distribution to end-of-life management.

Economic Impacts

Although electronics recycling has increased dramatically under the Oregon E-Cycles program, information on the program's economic impacts and job creation is limited. A March 2010 report by the Northwest Product Stewardship Council, "Preliminary Analysis of E-Cycle Programs in Washington and Oregon," highlighted the following impacts on processors and recyclers based on interviews with Northwest processors/recyclers during 2009, the first year of Oregon E-Cycles operations.

- Processors/recyclers estimated 61 net new jobs were created in Oregon for program start-up (79 jobs in Washington). An estimated ongoing 360 jobs at these facilities were attributable to Oregon and Washington E-Cycles programs.
- Processing capacity had increased in the Northwest. Three processors/recyclers established new facilities largely because of the E-Cycles programs, 1 in Oregon and 2 in Washington. Another acquired a facility because of these laws.
- The long-term ability of processors/recyclers to thrive under a producer responsibility system is untested.
- Short-term impacts on processors/recyclers were mixed. Some saw negative financial impacts (e.g. those not participating in E-Cycles), while others with newly established facilities were satisfied with the system.

Since the March 2010 NWPSC report, collection and recycling under the Oregon E-Cycles program has increased by 36.3 percent, likely creating additional new jobs.

Compliance Oversight

Each recycling program is responsible for ensuring the collectors, transporters and recyclers in its network comply with the operational standards and environmental management practices described in its approved plan. As described in those plans, the programs inspect all collection sites before they begin collection for Oregon E-Cycles

and inspect a number of existing collection sites annually. The programs also perform or require annual audits of their recyclers, or use recyclers that are certified by approved third-party certification programs. Audits must track whole CEDs, components and materials from the direct recycling facility through the point at which the material becomes a single material commodity suitable for final processing. Audits must also verify that downstream vendors appropriately managed the materials they received.

Each program reports the CEDs collected and recycled or reused each quarter to DEQ and submits an annual report that describes how its plan was implemented during the previous year. The annual report includes the outcomes of the inspections and audits conducted that year, including any issues identified and how they were resolved.

DEQ reviews the quarterly and annual reports and addresses any issues with the recycling programs. In 2011, DEQ also conducted oversight visits at 20 percent of Oregon E-Cycles collectors across the state and at all in-state recycling facilities. DEQ identified some concerns regarding facility operations or environmental management practices and is following up with the recycling programs to ensure improvement. For example, a few facilities were storing wastes where they could be exposed to stormwater, some lacked adequate plans for managing broken cathode ray tubes and some did not have adequate liability insurance. Based on these results, DEQ will conduct fewer but more targeted visits in 2012.

DEQ Administration

DEQ's duties include:

- registering manufacturers;
- publishing monthly lists of registered manufacturers and brands and manufacturers in compliance with the law;
- determining manufacturers' market share and registration fees;
- overseeing sampling of devices returned for recycling;
- determining the total weight of devices to be collected each year;
- calculating return shares and return shares by weight (minimum recycling obligations) for manufacturers;
- collecting registration fees and recycling fees for manufacturers in the state contractor program;
- reviewing recycling program plans and reports;
- administering the contract for the state contractor program;
- providing information to retailers, manufacturers and the public;
- conducting compliance oversight and enforcement activities; and
- working with stakeholders on program and policy planning and development.

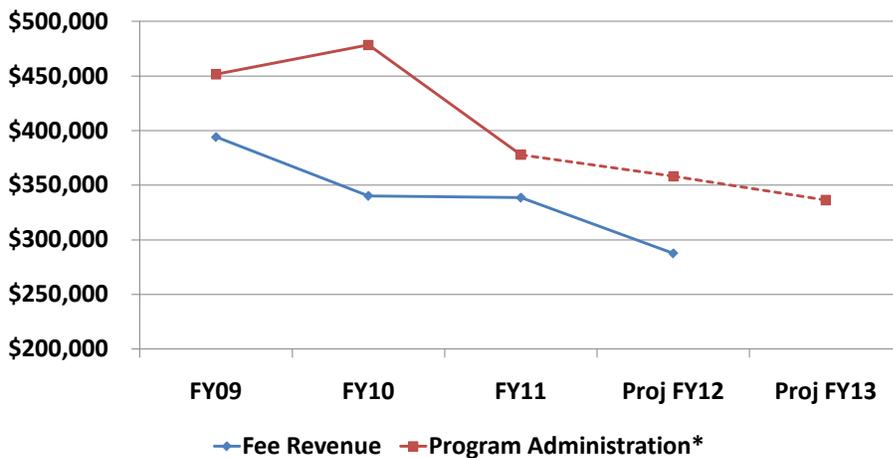
DEQ's E-Cycles program costs are funded by the annual registration fees manufacturers pay.⁴ The Legislature established a registration fee schedule in 2007 based on estimated costs and revenue for administering Oregon E-Cycles. The Legislature also authorized

⁴ Registration fees cover DEQ's costs for administering the E-Cycles program except for the state contractor program. Manufacturers in the SCP pay recycling fees that cover the full costs of that program, including DEQ's administrative costs.

the Environmental Quality Commission to modify those fees for 2012 and beyond so that registration fees approximately match DEQ’s costs for implementing the program.

The existing registration fee structure has not generated sufficient revenue to cover DEQ’s start-up and ongoing operating costs, even though current operating costs are lower than estimated in 2007, and additional streamlining may further reduce costs. DEQ has used solid waste disposal fee revenue to make up the registration fee revenue shortfalls each year. The graph in Figure 2 illustrates the revenue shortfalls.

Figure 2
Oregon E-Cycles Registration Fee Revenue and Program Costs



* Program costs paid by registration fee, excluding database development

In late 2011, DEQ convened an advisory committee with representatives from all major stakeholders (e.g., manufacturers, solid waste industry, local government and environmental groups) to help develop a revised registration fee structure that will cover DEQ’s costs. The advisory committee will meet through the spring of 2012. DEQ plans to recommend a revised fee structure to the Environmental Quality Commission for adoption in the summer of 2012.

Looking Forward

Oregon E-Cycles is a successful product stewardship program. Electronics manufacturers, service providers, government, retailers, consumers and other stakeholders have worked cooperatively to provide convenient, responsible recycling for the growing electronics waste stream. The program has significantly expanded opportunities for Oregonians to recycle electronic wastes and has shifted responsibility and costs for managing these waste products from rate payers and local governments to product manufacturers, sellers and users. DEQ will continue to work with recycling programs, the E-Cycles advisory workgroup and other interested parties to evaluate and improve Oregon E-Cycles as they collectively gain experience and take advantage of new opportunities to more effectively achieve priority environmental outcomes.