

# **Oregon E-Cycles Biennial Report**

**January 2014**



State of Oregon  
Department of  
Environmental  
Quality

**Submitted to: Oregon Legislature**  
**By: DEQ Materials Management, E-Cycles Program**



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## Executive Summary

This report fulfills the Oregon Department of Environmental Quality's requirement to submit a biennial report to the Oregon Legislature on operations of Oregon E-Cycles under Oregon's Electronics Recycling Law (Oregon Revised Statute 459A.340(8) ). The full 2014 Oregon E-Cycles Biennial Report is available at: [www.deq.state.or.us/pubs/legislativepubs/](http://www.deq.state.or.us/pubs/legislativepubs/)

Oregon's Electronics Recycling Law, adopted in 2007, established a product stewardship program<sup>1</sup> 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 in or into Oregon must register their brands with DEQ and join either the state contractor or a manufacturer-run recycling program. Each recycling program operates under a plan approved by DEQ and is funded by its participating manufacturers.<sup>2</sup>

Retailers may sell in or 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 27.7 million pounds of devices were recycled and another 38,038 units were reused through Oregon E-Cycles during 2013 alone. Since 2009, Oregon E-Cycles recycling has saved approximately 1,870 billion British thermal units of energy, which equals approximately 14 million gallons of gasoline. DEQ estimates that net greenhouse gas reductions amount to 141,500 metric tons of carbon dioxide equivalent, comparable to the benefit of eliminating tailpipe emissions from approximately 30,500 average passenger cars per year.

Currently three recycling programs comprise Oregon E-Cycles: a state contractor program operated by a private entity under contract with DEQ, and two manufacturer-run recycling programs. Combined, these three programs include more than 150 manufacturers and use six recyclers.

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<sup>1</sup> 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.

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

Each recycling program must ensure that the collectors and recyclers in its network comply with approved standards and practices. The programs must also verify that devices are managed appropriately from initial collection through the point at which materials are processed into single-stream commodities. Collectors and recyclers must comply with and be able to document compliance with all laws of the transit and recipient countries applicable to operations and transactions in which it engages.

In its oversight role, DEQ reviews program reports, visits collectors and recyclers across the state and addresses any issues with the recycling programs. As planned, DEQ conducted fewer but more targeted visits between 2012 and 2013. DEQ plans to continue conducting site visits for ongoing improvements at participating collection centers and in-state recycler facilities.

Although Oregon E-Cycles recycling programs change slightly every year, the three programs have established a stable collection, transportation and recycling infrastructure with more than 300 collection sites and additional collection events statewide. The number of collection sites across the state has increased more than 37 percent since the program began collection in 2009.

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. 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 Oregon 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 electronic 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 (for example, collection events and retailer take-back programs) 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.<sup>3</sup> 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 having 10 or fewer employees 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

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<sup>3</sup> 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 Jan. 1, 2010.

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. DEQ has begun registering printer manufacturers for 2014 to begin collection in 2015. 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.

On June 21, 2012, the Oregon Environmental Quality Commission adopted rules revising registration fees that electronics manufacturers pay to cover DEQ's costs for administering Oregon E-Cycles. The revised fee structure will ensure that annual manufacturer registration fees cover DEQ's costs. The adopted rules are included in the commission's staff report located on the Oregon E-Cycles website.

# Oregon E-Cycles Implementation

## Program Performance

Oregon E-Cycles began collecting and recycling computers, monitors and TVs in January 2009, and completed its fifth year of operations in December 2013. Table 1 summarizes program performance since 2009.

Table 1. Oregon E-Cycles Program Performance

	2009	2010	2011	2012	2013	Totals
<b>Recycling / Reuse</b>						
<i>Statewide recycling goal (millions of pounds)</i>	12.2	21.5	23	27	28.6	112.3
<i>Total recycled (millions of pounds)*</i>	19.0	24.2	25.9	28.1 <sup>4</sup>	29.7 <sup>5</sup>	123.5
<i>Per capita recycled (pounds)*<sup>6</sup></i>	4.96	6.3	6.75	6.9	7.1	N/A
<i>Units reused*</i>	25,900	38,000	36,007	20,390	38,038	158,335
<b>Recycling Programs</b>						
<i>Recycling Plans</i>	3 mfr + 1 state	3 mfr + 1 state	3 mfr + 1 state	2 mfr + 1 state	2 mfr + 1 state	N/A
<i>Participating manufacturers</i>	176	162	169	160	155	N/A
<b>Services</b>						
<i>Collection sites</i>	~220	~240	~230	~282	~301	N/A
<i>Collection events</i>	22	17	13	8	18	N/A
<i>Recyclers</i>	6	6	8	6	6	N/A
<b>Energy Savings / Greenhouse Gas Reductions</b>						
<i>Energy savings (BTUs, in billions)</i>	290	370	390	400	420	1,870
<i>equivalent gallons of gas (millions)</i>	2	3	3	3	3	14
<i>GHG emissions reductions (MTCO<sub>2e</sub>)</i>	22,000	28,000	30,000	30,500	31,000	141,500
<i>equivalent tailpipe emissions cars/yr</i>	4,500	5,700	6,100	7,000	7,200	30,500

<sup>4</sup> Actual collections in 2012 is 26.7 million (without using credits)

<sup>5</sup> Actual collections in 2013 is 27.7 million (without using credits)

<sup>6</sup> Based on actual collection totals

\*Preliminary results as of January 15, 2014. Final results to be reported March 1, 2014

### *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, sales of covered electronics and light-weighting of covered electronics when setting recycling goals. The statewide recycling goal for 2014 is 29.26 million pounds of computers, monitors and TVs, which is 7.4 pounds per capita.

The weight of electronic devices recycled and the amount reused as well as the list of collections sites has increased each year since the Oregon E-Cycles program began. This reflects an increasing demand for these services. Preliminary figures show nearly 27.7 million pounds of electronic devices were recycled and another 38,038 units were reused in Oregon during 2013. 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 Oregon E-Cycles – should also increase. As the mix and weight of devices returned for recycling changes (for example, fewer old, heavy TVs and computers and more lighter-weight flat screens, laptops and tablets), the total weight of electronics recycled each year may stabilize or even decline.

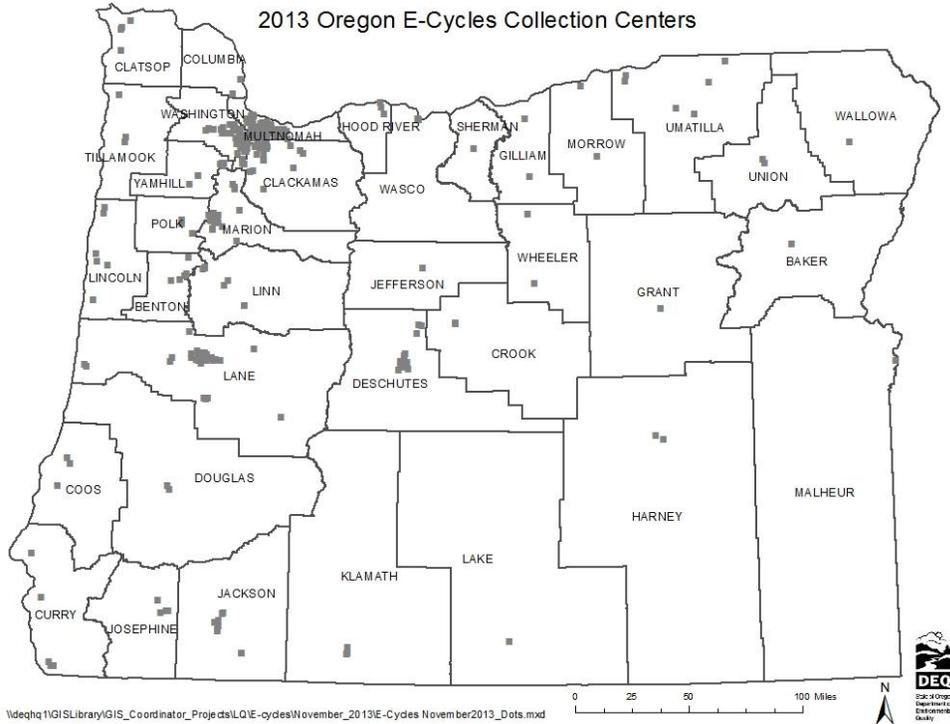
### *Recycling Programs*

Three recycling programs comprise Oregon E-Cycles operations. Combined, these three programs include over 150 manufacturers. The programs are a state contractor program operated by the National Center for Electronics Recycling under a contract with DEQ, and two manufacturer-run programs: Electronic Manufacturers Recycling Management Company LLC, and Manufacturers' Group Plan operated by Reverse Logistics Group Americas Inc.

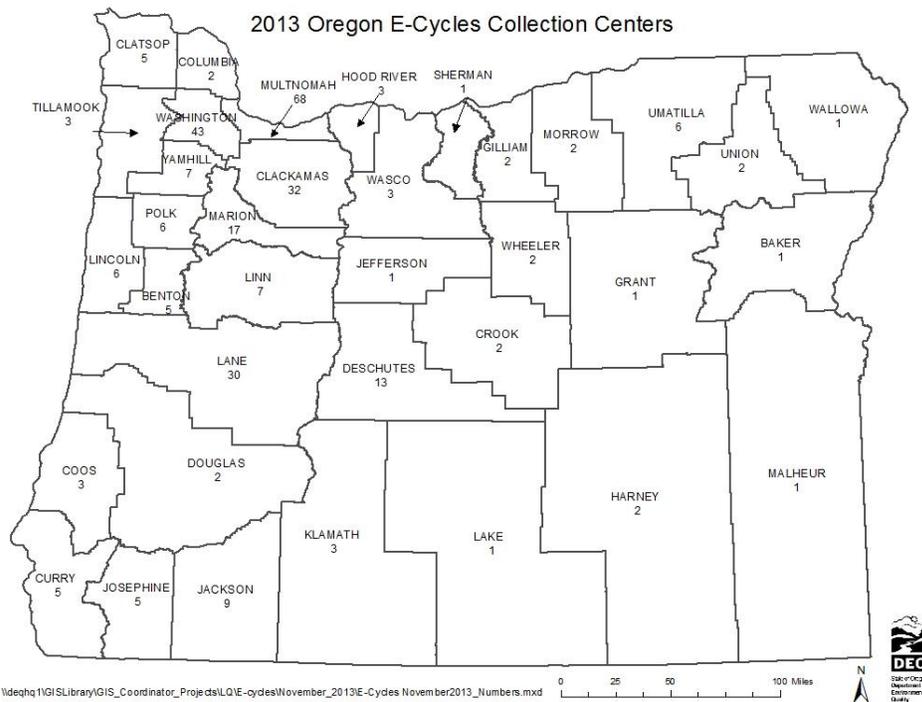
### *Services*

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 three programs have established a fairly stable recycling infrastructure for Oregon E-Cycles with more than 300 collection sites currently participating across the state. 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. Figures 1 and 2 provide maps of the collection centers in Oregon as of November 2013. DEQ's E-Cycles web pages provide a search page and hotline number for locating collection sites and services.

**Figure 1. Location of Oregon E-Cycles Collection Centers, 2013**  
Collection events and other services not included



**Figure 2. Number of Oregon E-Cycles Collection Centers in Each County, 2013**  
Collection events and other services not included



The three recycling programs collectively used the following six recyclers during 2013. 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
- Total Reclaim Inc., Portland, OR (sends some material to Seattle, WA)
- Free Geek, Portland, OR
- Electronic Collection Services Refining, Portland, OR, Santa Clara, CA (consolidation point in Medford, OR)
- IMS Electronic 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 energy savings and reductions in greenhouse gases associated with recycling computers, monitors and TVs through the Oregon E-Cycles program since it began collection in 2009. Those savings are significant.

During 2013 DEQ estimates E-Cycles recycling has led to energy savings of approximately 420 billion BTUs, which is equivalent to approximately 3 million gallons of gasoline. Net greenhouse reductions are estimated at 31,000 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 7,200 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 about 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," provided information about impacts to processors based on interviews with Northwest processors during 2009, the first year of Oregon and Washington E-Cycles operations. DEQ's 2012 E-Cycles Biennial Report summarized that report.

## **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 certified by approved third-party certification programs such as Responsible Recycling Practices (R2) and the e-Stewards® standards. Audits must track whole covered electronic devices, 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. Collectors and recyclers must comply with and be able to document compliance with all laws of transit and recipient countries applicable to operations and transactions in which it engages.

Each program reports the covered electronic devices 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 outcomes of inspections and audits conducted that year, including any issues identified and how they were resolved.

DEQ also conducted fewer but more targeted oversight visits to collectors and in-state recycling facilities across the state.

## 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, advisory groups as needed, 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.