



E-Cycle Wisconsin 2014 report

*Wisconsin DNR annual report to the Legislature
and governor under s. 287.17(10), Wis. Stats.*

December 2014

Executive summary

Wisconsin's electronics recycling law has achieved many successes since it took effect in 2010, most notably recycling more than 160 million pounds of electronics and greatly expanding electronics recycling access for Wisconsin residents. Wisconsin has been a leader among state electronics recycling programs when it comes to the number of collection sites available and weight of electronics collected per person, and many stakeholders have praised the structure and overall administration of the program.

Since 2010, however, both the nature of electronics being sold and the markets for materials found in electronics—particularly the glass found in the cathode ray tubes (CRTs) that older TVs and computer monitors contain—have changed dramatically. Due to the popularity of smaller and lighter electronics and manufacturers' design improvements to reduce product weight, the weight-based manufacturer recycling targets, which are set by a statutory formula, have declined substantially over the last two years, while the weight of electronics collected for recycling through E-Cycle Wisconsin has remained steady. Dwindling markets for the leaded glass in CRTs have increased recyclers' per-pound costs, but manufacturer payments have not always risen to match.

As a result, unless manufacturer recycling targets are updated, the collection and recycling system funded by manufacturers will no longer meet the electronics recycling demand of Wisconsin households and schools, particularly in rural areas of the state. During the current program year (July 2014 to June 2015), many recyclers have dropped collection sites and collection events (especially in rural areas), and are charging collectors more or higher fees to take electronics for recycling. Fewer collection sites and higher costs may lead to increased illegal dumping of electronics—which DNR surveys indicate remains a problem—or to irresponsible backyard scrapping of

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Other program results

Find earlier E-Cycle Wisconsin annual reports, survey summaries and other program results at <http://dnr.wi.gov/topic/Ecycle/wisconsin.html#tabx2>.

electronics. It is also likely to increase the financial burden on taxpayers to either collect electronics or clean up dumped devices.

In summary, the basic structure of the law is still sound, and there are many successes to celebrate. Changes will be needed to maintain Wisconsin residents' access to affordable electronics recycling—particularly in rural areas.

Program successes

- Between January 2010 and June 2014, Wisconsin households and schools recycled 160 million pounds of electronics through E-Cycle Wisconsin. During program year 5 (July 2013 to June 2014), registered collectors took in 37.2 million pounds of electronics, or 6.5 pounds per Wisconsin resident—one of the highest rates in the country.
- More than 90 percent of the electronics collected under E-Cycle Wisconsin are processed initially in Wisconsin or other Midwest states, contributing to continued growth in the region's electronics recycling industry.
- During program year 5, nearly all manufacturers met or exceeded their recycling targets, with only a handful of companies with small recycling targets choosing to pay a shortfall fee to the state instead of purchasing recycled pounds.
- The number of registered collection sites available to Wisconsin residents remains much higher than before the law passed. During program year 5, there were about 650 permanent or special event collection sites in 68 of Wisconsin's 72 counties, covering 99 percent of the state's population. Since the law took effect, only one county has not had a collection site registered under the program at some point.
- The vast majority of manufacturers, recyclers and collectors are complying with the law, and the DNR has taken actions to ensure a level playing field for program participants.

Recommendations

The electronics recycling law directs the DNR to examine several aspects of the law within the annual report and make recommendations for possible changes. The following is a list of relatively minor changes that could be made to improve administration of the electronics recycling law, for the Legislature's consideration.

- To better match the budget cycles of many manufacturers, recyclers and collectors, change the annual program year so that it corresponds to a calendar year (Jan. 1 to Dec. 31), rather than the state fiscal year, and adjust reporting dates accordingly.
- Change the registration fee levels in s. 287.17(4)(b) to assist small businesses by reducing or eliminating registration fees paid to the state by very small electronics manufacturers.
- Modify the definition of "school" under s. 287.17(1)(np) to allow all K-12 schools in Wisconsin to recycle electronics through E-Cycle Wisconsin.
- Clarify that cell phones and video game consoles meet the definition of consumer computer under the law, and add portable DVD players as a category of covered electronics.

Introduction

Wisconsin's electronics recycling law (s. 287.17, Wis. Stats.) establishes a statewide program to collect and recycle certain electronics. Under this product stewardship-based law, manufacturers of TVs, computers and desktop printers must register with the DNR the brands they sell to households and schools in Wisconsin, and recycle a target weight of electronics each year based on their sales. Manufacturers contract with state-registered recyclers and collectors to meet their targets. This manufacturer-funded recycling program is called E-Cycle Wisconsin.

This report fulfills the annual reporting obligation in s. 287.17(10), Wis. Stats., which specifies several metrics on which the DNR must report to the Legislature and governor each year. These include the weight of electronics collected under the program and other basic information provided by program participants, an outline of electronics recycling outside of E-Cycle Wisconsin, a summary of compliance and enforcement actions related to the disposal bans, and recommendations for any changes needed.

To help evaluate the law and the DNR's administration of it, we also examine whether the law is meeting these six general criteria:

- Keeping electronics out of landfills and the environment.
- Using a market-based approach to manage e-waste in the most efficient and cost-effective manner possible, with minimal government intervention.
- Reducing electronics recycling costs and improving recycling convenience for consumers.
- Reducing the financial and administrative burden on local and state governments of managing e-waste.
- Ensuring a level playing field for all participants in the electronics recycling program, including accountability for environmental, worker safety and other standards.
- Encouraging and supporting a strong electronics recycling industry in Wisconsin and the Midwest.

The results presented below suggest that, after several very successful years, E-Cycle Wisconsin and the disposal ban are encountering growing challenges in fulfilling the first four of the above criteria. This is primarily due to a growing gap between declining manufacturer recycling targets—driven by a steady reduction in pounds per unit sold—and continued robust collection of older, heavier electronics. Increasingly tight and expensive markets for cathode ray tube glass—which makes up more than half the weight of material collected under E-Cycle Wisconsin—are also contributing to rising recycling costs which have not been fully covered by manufacturer payments.

E-Cycle Wisconsin program years

Program years run from July 1 to June 30. The first program “year” lasted just six months, to get the program on this calendar. Here are the dates for program years referenced in this report.

Program year 1

January 1 to June 30, 2010

Program year 2

July 1, 2010, to June 30, 2011

Program year 3

July 1, 2011, to June 30, 2012

Program year 4

July 1, 2012, to June 30, 2013

Program year 5

July 1, 2013, to June 30, 2014

Program year 6

July 1, 2014, to June 30, 2015

Table 1: Program year 5 registration and participation

Category	Registered	Active
Collectors	143	129 (90%)
Recyclers	30	25 (83%)
Manufacturers	110	n/a
Brands	167	n/a

“Active” means a collector that sent electronics to a registered recycler or a recycler that received electronics from registered collectors.

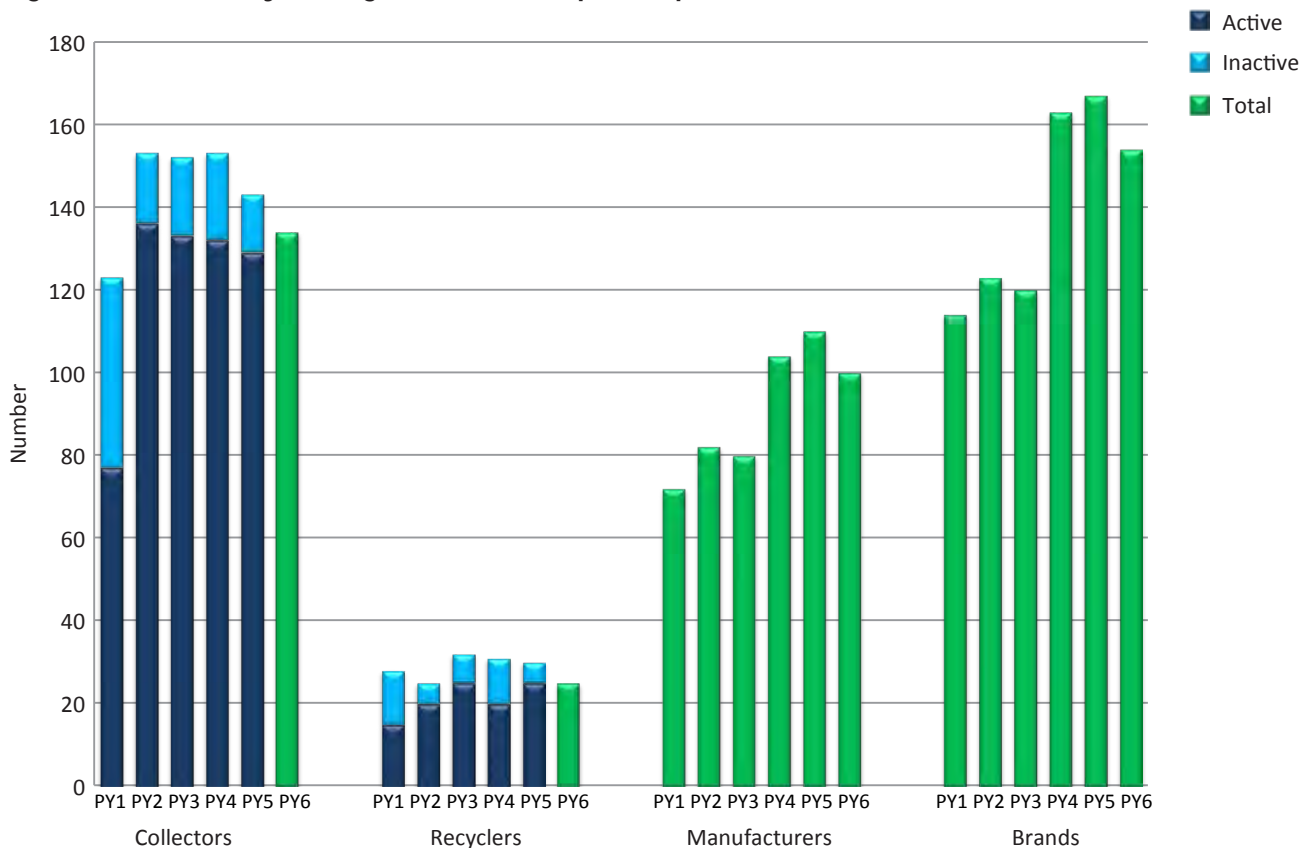
The DNR believes the fundamental structure of the electronics recycling laws remains sound, and that the current challenges will decrease over time as fewer CRT-containing TVs and monitors need to be recycled. However, the current challenges require attention to ensure continued widespread public access to electronics recycling. Further discussion of these issues and policy recommendations are included at the end of this report.

Program participation

E-Cycle Wisconsin collector and recycler registrations in program year 5 were down slightly from program year 4, and have continued to decline in program year 6. The number of registered manufacturers and brands increased slightly in program year 5, and should be similar for program year 6 once all registrations are in. Table 1 shows registrations for program year 5, and Figure 1 illustrates registration trends over the first six program years (with program year 6 numbers as of October 2014).

Registered collectors include local governments, electronics retailers, other for-profit businesses and non-profits. The mix of collectors has remained relatively unchanged.

Figure 1: Summary of registration and participation



PY = program year. Program year 6 totals as of October 2014.

Wisconsin has maintained one of the highest numbers of collection sites per capita among states with electronics recycling laws. During program year 5, there were 465 permanent and 191 temporary or event collection sites registered with E-Cycle Wisconsin for at least part of the year, a total of 656. For-profit collectors operated the highest number of sites (371, or just over half), though many of these were at retail or government locations, as shown in Figure 2. During program year 5, there were E-Cycle Wisconsin collection opportunities in 68 of Wisconsin’s 72 counties, covering more than 99 percent of the state’s population (see map in Appendix A).

As Figure 3 shows, the proportion of active E-Cycle Wisconsin collectors charging fees to consumers remained steady from program year 4 to 5, with 71 percent offering at least some free collection opportunities. Just under two-thirds of active collectors charged some type of fee. Most charged a per-item fee (e.g., \$10 for a TV). A smaller portion charged a per-pound fee (e.g., 20 cents a pound for TVs). A few charged some other type of fee—like a site visit fee or a pick-up fee. Some used a combination of fee types. More than half of the collectors charging fees did take some items for free.

Per-pound fees ranged from 5 to 50 cents a pound, with most collectors charging in the middle of that range—similar to the previous program year. Per-item fees ranged from \$2 to \$50 and were also very similar to program year 4 rates. Regardless of the type of fee, the highest charges were for CRT TVs, especially large models.

Figure 2: Program year 5 collection sites, by type

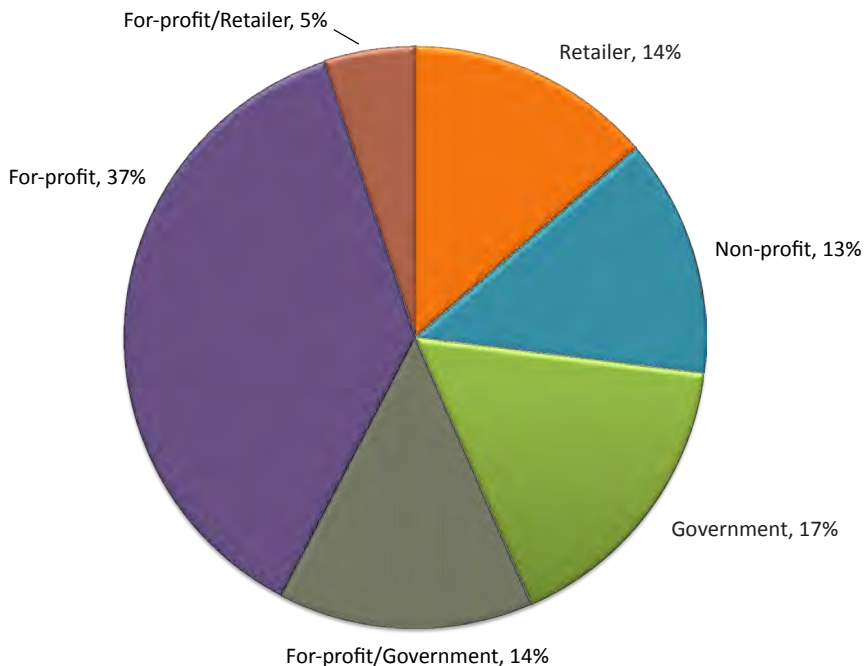


Figure 3: Fees charged by registered collectors, by year and fee type

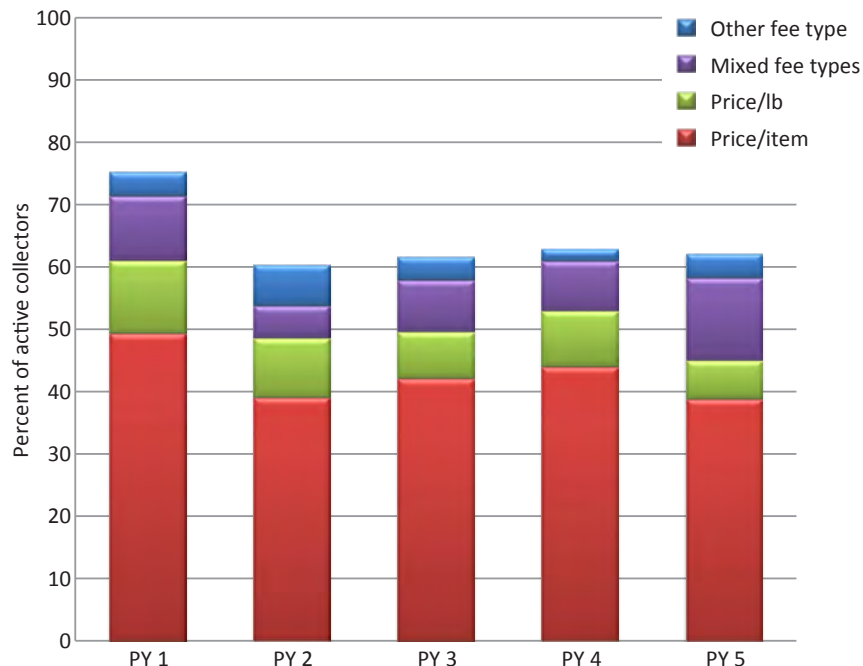
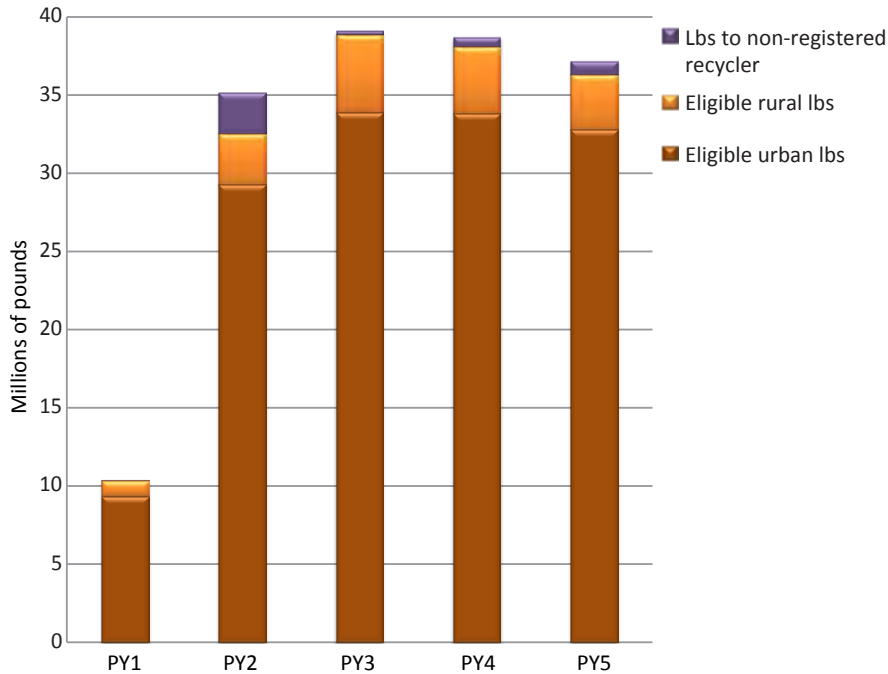


Figure 4: Pounds collected by registered collectors



Collection and recycling totals and analysis

Wisconsin households and schools have participated enthusiastically in E-Cycle Wisconsin, recycling more than 160 million pounds of electronics since 2010 (see Figure 4). Collection of eligible electronics under E-Cycle Wisconsin during program year 5 declined slightly from program year 4. From July 2013 through June 2014 (program year 5), registered collectors took in 37.2 million pounds of electronics from Wisconsin households and schools (see Table 2). This was equivalent to 6.48 pounds per capita.

Table 2: Eligible electronics collected by registered collectors, program year 5

Type	Pounds
Urban	32,756,213
Rural	3,557,426
Not sent to registered recyclers	876,279
Total collected	37,189,918

Table 3: Pounds collected, by collector type

Type	PY4	PY5
Retailer	8,052,553	7,137,265
Non-profit	7,603,039	8,523,474
Gov't	7,478,395	8,324,322
For-profit	15,581,279	13,204,858
Total	38,715,266	37,189,918

PY = program year

Wisconsin remains one of the top performers in per-capita collection totals among the 25 states with electronics recycling laws.

Collection increased from program year 4 to 5 among non-profit and government collectors, and declined among retailer and for-profit collectors, as shown in Table 3. A small number of registered retailer and non-profit collectors accounted for a large portion of the total in all five program years.

Nearly all electronics collected under E-Cycle Wisconsin in program year 5 were processed in the upper Midwest, as shown in Figure 5. Wisconsin recyclers processed the largest share (49 percent).

Collection significantly exceeded the overall manufacturer recycling target for program year 5 of approximately 28.4 million pounds. With the rural credit factored in and pounds diverted for reuse subtracted out, Table 4 shows that registered recyclers had just under 37 million eligible pounds available for purchase by manufacturers, and sold 29.5 million pounds. The manufacturer target, and thus the weight purchased by manufacturers, was down several million pounds from program year 4 due primarily to smaller and lighter electronics being sold than in the past.

Compliance and enforcement within E-Cycle Wisconsin

Much of the DNR’s administration of the electronics recycling law is focused on maintaining a level playing field for E-Cycle Wisconsin participants and identifying problems at collection sites or recycling facilities that might endanger human or environmental health. Many stakeholders have cited Wisconsin as a national leader in these efforts, particularly in its use of an online registration and reporting system and careful accounting of collection and recycling transactions among program participants. During 2013 and 2014, the DNR emphasized gaining compliance from electronics retailers and collectors through education, inspections and technical assistance, while continuing compliance work with recyclers and manufacturers.

Compliance among registered manufacturers

Manufacturers of all major electronics brands have complied with Wisconsin’s electronics recycling law by registering their brands of covered electronics sold to households and schools, and by paying the statutory annual registration fee.

Based on responses to DNR’s 2012 manufacturer survey and continued discussions with stakeholders, it appears that most manufacturers rely on the recyclers they contract with to find and/or set up collection networks. Prominent exceptions include the Dell Reconnect program, in which Dell works with several networks of Goodwill stores; Best Buy’s in-store collection program (Best Buy is also a manufacturer); a partnership between Hewlett Packard and Staples; and Apple’s recycling program for schools.

During program year 5, just under one-third of registered manufacturers (34) participated in a manufacturers’ collective that contracts with recyclers for a large total sum of pounds and distributes the recycled pounds among its members. The largest active collective is MRM (17 manufacturers), with a smaller number of manufacturers participating

Figure 5: Percent of program year 5 pounds received by registered recyclers, by state

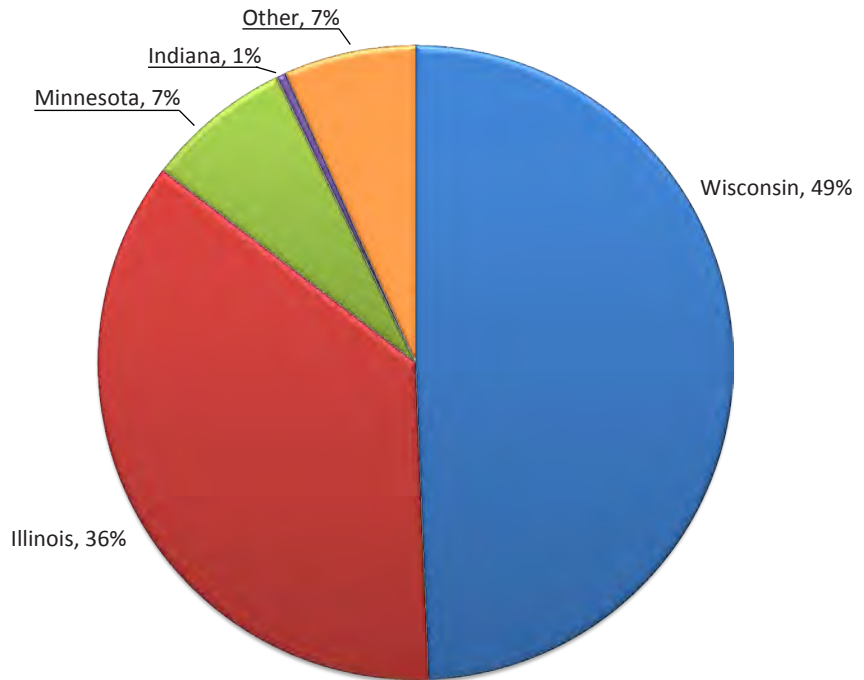


Table 4: Eligible pounds received and recycled, program year 5

Type	Pounds
Urban received	33,006,658
Rural received	3,301,806
Rural credit	825,451
Diverted for reuse	(169,319)
Available for manufacturers	36,964,097
Sold to manufacturers	29,522,265

Rural credit is 1.25 pounds per pound collected. For a map of which counties are designated urban and rural, see <http://dnr.wi.gov/topic/Ecycle/documents/countiesmap.pdf>.

Urban and rural pounds differ slightly from Table 2 because of how collectors and recyclers report pounds collected before a program year end but not received by a recycler until the next year, and because some recyclers choose to count all pounds as urban.

Registration lists

The DNR keeps updated lists of registered and unregistered manufacturers and brands, registered recyclers and collectors, and registered collection sites on its website. Lists are available at <http://dnr.wi.gov/topic/Ecycle/wisconsin.html>.

Table 5: Program year 5 manufacturer credit transactions

	Credits
Beginning balance	4,641,613
Credits applied	(1,326,430)
Credits expired	(341,116)
New credits earned	1,503,020
Total available for future use	4,477,082

Table 6: Manufacturer registration and shortfall fees

Program year	Registration fees	Shortfall fees
1	\$261,250	n/a
2	\$270,000	\$8,453
3	\$275,000	\$19,210
4	\$310,000	\$10,105
5	\$310,000	\$9,123
6	\$273,750	--

Registration fees for program year 6 and shortfall fees for program year 5 as of November 2014. The law did not assess shortfall fees for program year 1.

in E-World Online (8), Reverse Logistics Group (6) and 3R Network (2). These collectives were responsible for about 45 percent of the recycled pounds purchased by manufacturers during program year 5.

A challenge for the DNR remains getting all manufacturers to register and pay applicable registration fees by the Sept. 1 due date. In 2014, 11 previously registered manufacturers had failed to submit required forms and/or payment by mid-November.

Most manufacturers continued to successfully meet or exceed their sales weight-based recycling targets in program year 5, with just a handful with small targets choosing to pay shortfall fees. Twenty-five manufacturers recycled more than their target weights and earned credits for use in future years (though in some cases, the amounts were negligible—a few pounds or less). In total, manufacturers earned just under 1.5 million credits (see Table 5). Eight manufacturers used just over 1.3 million credits they had either earned in a previous year or purchased from another manufacturer to meet their program year 5 targets. At the end of program year 5, just under 4.5 million pounds of credits were available to manufacturers for future use.

Each year, the DNR works with manufacturers to help them purchase eligible recycled pounds rather than pay a shortfall fee, but several have said it is more convenient for them to pay the fee than to go through the process of contracting with a recycler. During program year 5, 14 manufacturers paid a fee, all but one for their entire obligations. The amounts ranged from \$3 to \$6,664.50.

Table 6 summarizes the registration and shortfall fees paid during the first six E-Cycle Wisconsin program years.

Manufacturer registration compliance efforts

While all major brands are registered under the program, smaller manufacturers that sell only one or two types of electronics continue to present a registration challenge. In many cases, these manufacturers are new to the market and unaware of their obligations under Wisconsin's law. In other cases, manufacturers fail to register even when contacted by the DNR, a retailer and/or another state.

The DNR has found the best way to increase registration is to have retailers contact unregistered manufacturers to let them know their brands cannot be sold in the state until they are registered. During winter 2013-14, the DNR provided 13 major retailers with lists of unregistered brands found for sale in their stores (67 brands total). Within a few weeks, 11 brand owners contacted the DNR to register or ask to be removed from the unregistered list because their product was for business use only.

Retailer compliance

Electronics retailers have two major responsibilities under the electronics recycling law: they must sell only brands of covered electronics registered in the state, and they must educate their customers about the electronics disposal ban and electronics recycling opportunities.

The DNR began retailer compliance efforts with outreach and then moved toward enforcement. In fall 2012, E-Cycle Wisconsin staff sent a Retailer Toolkit to all brick-and-mortar electronics retailers in the state, informing them of their obligations. In 2013, staff inspected 55 stores around the state to follow up and assess compliance with the law. During the inspections, 10 stores were selling unregistered brands and 45 were not providing any type of education and outreach to their customers.

Based on these inspection results, the DNR developed a plan to improve compliance. In November 2013, staff sent a letter to each Wisconsin store location of the retail chains Best Buy, Kmart, RadioShack, Sears, Shopko, Target and Walmart. Corporate contacts for each chain also received the letter. These chains were chosen for this initial enforcement effort because they had a significant number of store locations and DNR staff had found multiple stores to be out of compliance. The letter informed the store manager of retailer requirements under the law and warned that the E-Cycle Wisconsin program would begin using enforcement, in addition to education, to gain compliance.

Following this letter, the DNR performed 17 compliance inspections and sent five notices of non-compliance (NONs) in mid-January 2014. All stores subsequently came into compliance.

Inspections of recyclers and collectors

All registered recyclers must comply with program requirements as well as other solid and hazardous waste regulations. Recyclers must provide documentation showing that they carry adequate owner financial responsibility (OFR) for facility closure and at least \$1 million in pollution liability insurance. In-state recyclers are inspected at least once every 18 months and out-of-state recyclers are also subject to inspections. Due to travel considerations, most out-of-state recyclers have not been inspected, but DNR staff have visited registered recyclers in Minnesota in 2013 and will visit some recyclers in Illinois during the current program year. On-site inspections help verify that electronics collected under E-Cycle Wisconsin are managed in an environmentally sound manner and sent to legitimate downstream vendors.

Collectors registered with E-Cycle Wisconsin must also meet minimum standards, including recordkeeping and reporting to the DNR, and are subject to DNR inspections. Between March 2013 and June 2014, the DNR made a special effort to inspect many collection sites for the first time. The intent was to educate collectors on best management practices and gain voluntary compliance. Inspectors completed a total of 170 inspections with more than 100 different collectors during this period. Only 21 of the collectors registered during program year 5 have never been inspected by the E-Cycle Wisconsin program. Inspections at sites operated by those collectors are a priority in program year 6.

Inspectors found many collection site operators were not aware of rules governing management of used electronics, and many sites had similar management problems. These included improper handling of broken CRT glass, stacking materials too high, using containers unsuitable for the contents, using uncovered outdoor storage, engaging in unacceptable recycling activities and keeping poor records. Inspectors addressed these problems in person, provided appropriate guidance documents and issued follow-up letters with instructions on how to better manage the site or correct any problems. Every collector made the required corrections and provided documentation to the DNR. Many collectors also improved their sites by

Table 7: DNR inspections conducted, by program year

Time period	Recyclers	Collection sites
Jan. 1 to June 30, 2010	4	5
July 1, 2010, to June 30, 2011	8	20
July 1, 2011, to June 30, 2012	8	29
July 1, 2012, to June 30, 2013	10	65
July 1, 2013, to June 30, 2014	10	116
July 1 to Nov. 1, 2014	3	2

Electronics recyclers listed in the Wisconsin Recycling Markets Directory

The Wisconsin Recycling Markets Directory (<http://wisconsinrecyclingdirectory.com>) is operated by the UW-Extension Solid and Hazardous Waste Education Center, with some funding support from the DNR. Businesses, local governments and others that collect or recycle a wide variety of materials may list themselves in the directory. One category included in the directory is electronics, and as of November 2014, there were 116 locations listed under that category—a mix of collectors and recyclers. Only 42 of the locations listed were registered with E-Cycle Wisconsin.

following recommendations for best management practices.

To address some of the issues found during collection site inspections, the program has increased targeted outreach to collectors registered with E-Cycle Wisconsin. Staff created a Collector Best Management Practices video and handout, updated

the Collector Frequently Asked Questions and Choosing a Recycler handouts and created a What to Expect When You're Inspected handout. The DNR is mailing all of these materials to registered collectors.

Table 7 lists the number of inspections the DNR has conducted each program year.

Compliance among registered collectors and recyclers

Since E-Cycle Wisconsin began, several recyclers and collectors have been removed from the program. In all cases, the DNR gave collectors and recyclers extra time to submit paperwork (several weeks or more) and offered technical assistance to help them comply.

The most common reason for recycler removal is failure to maintain adequate owner financial responsibility. Other reasons for removal of recyclers and collectors include failure to submit registration forms or meet reporting requirements. Many recyclers and collectors have voluntarily left the program because it no longer fit with their business plans or other activities. Through November 2014, no registered collectors or recyclers had been removed from the program because of environmental violations.

During program year 6, as of November 2014, five collectors had failed to submit complete re-registration and report forms and were suspended from the program. One business registered as both a collector and recycler was suspended for failure to provide adequate requested records related to electronics at the facility and downstream vendors.

Electronics recycling separate from E-Cycle Wisconsin

Currently, collectors and recyclers that perform basic disassembly of electronics are treated as exempt from most solid and hazardous waste requirements, as long as the materials are handled appropriately. Consequently, only recyclers participating in E-Cycle Wis-

consin are operating under DNR regulatory oversight. Monitoring recycling activities that occur outside of E-Cycle Wisconsin has been challenging; often these activities only come to the DNR's attention when a problem occurs.

Inquiries from aspiring recyclers

Since before E-Cycle Wisconsin began, electronics recycling has appealed to some as a business opportunity, based on increased demand for recycling and the misinformed idea that recycling electronics is simple. While inquiries to DNR staff about operating electronics recycling businesses declined during 2014, staff still receive questions from potential recyclers every month or two.

Illegal and irresponsible electronics processing

Not everyone contacts the DNR about starting an electronics collection or recycling business. The DNR continues to receive complaints about dumped electronics and small-scale processors that have handled material—particularly CRT glass—inappropriately.

Often, the DNR hears about problems with managing electronics directly from the person responsible for the mismanagement. These individuals contact DNR or local solid waste officials to learn how to dispose of CRT glass they accumulated after stripping TVs or monitors of valuable metals. They are surprised to learn there is a high cost to manage the CRT glass and it usually ends up costing them more than they made from the metals. In these cases, the DNR or local officials educate the person about how to properly manage electronics and provide help finding an outlet for the glass. Typically, these people indicate they are not going



Top: A Shawano County site visited in November 2014 where electronics were being improperly managed for scrap and other materials were being burned illegally.

Bottom: Bare cathode ray tubes and other components at a site in Buffalo County where electronics were being illegally burned. The property owners spent about \$1,650 to clean up the site.



The above photo was taken in September 2014 at a site in Oconto County where residents were illegally burning electronics as part of an effort to recover scrap metal. The photo shows broken CRT glass, which contains lead. Note the charred trees in the background from burning.

to take electronics anymore once they understand the cost of managing the materials properly.

In other cases, DNR staff or local officials discover electronics mismanagement during complaint investigations of open burning, stockpiling or illegal dumping. DNR staff responded to at least a dozen complaints involving mismanaged electronics during the last program year. These individuals often start recycling electronics as a way to make a little bit of money, but they end up hurting themselves financially when they contaminate their own properties and incur costs to properly dispose of the remaining materials.

Examples of these cases include:

- Numerous investigations of open burning and illegal disposal complaints where staff have discovered that individuals have burned electronics to remove plastic from metals and as a disposal method for components that are not easily recycled, such as wood cabinets from console TVs and plastic casings.
- One property owner in Buffalo County had been burning electronics and, when discovered, he was ordered to take the remaining electronics to a recycling facility and remove and properly dispose of ash from a burn pit. The property owner complied and cleaned up 1,383 pounds of electronics and 494 pounds of ash at a cost of approximately \$1,650 for disposal fees.
- An elderly couple who had been recycling electronics, which included breaking CRTs and open burning. Since the case began, the home has been condemned and the couple were found incompetent and placed in a group home. It is believed that they do not have the means or the ability to help manage the cleanup. There remain about 500 TV casings, 200 intact TVs, two piles of broken glass, as well as other debris and burn piles that need to be removed. DNR hazardous and solid waste staff are exploring options to help get the property cleaned up.

Disposal ban compliance and enforcement

DNR public outreach efforts

A basic component of the DNR's compliance efforts remains education and outreach to the general public and participant groups, to make sure they are aware of the law and its requirements. The electronics recycling law directs the DNR to conduct this outreach.

A 2013 survey of Wisconsin households found nearly half of Wisconsin residents did not know where

to take electronics for recycling. In response, the DNR increased general public outreach to include new media, with an emphasis on reaching younger residents in parts of the state where the survey indicated awareness of the law was lower.

Advertisements, press releases and social media emphasize that electronics can no longer be put in the trash and that the DNR has a list of locations where electronics can be recycled. The DNR used both targeted online advertising and television advertising for the first time in 2014. The online ads ran for several weeks in January and targeted people who had been searching for electronics over the holidays. The 30-second television ad ran for six weeks in April and May on cable stations in the northern and southeastern regions of the state. The DNR will continue to use new and proven media in its 2015 advertising by working with a professional media buyer.

Illegal dumping and disposal of electronics

The DNR continues to receive anecdotal reports of electronics dumped on rural lands, in ditches and in vacant lots. Often, these are cases of an individual dumping one or two items, most commonly TVs. There are also cases—such as one in Madison where several dozen identical TVs were dumped in two locations—where the electronics likely came from a business.

While it is difficult to get a comprehensive picture of illegal dumping, E-Cycle Wisconsin staff conducted two online surveys in fall 2014 to gauge the extent of dumping on public lands and at landfills and transfer stations. This was the second time program staff conducted these surveys since the electronics recycling law took effect.

Public lands

The 2014 public lands surveys asked managers of municipal, county, state and federal lands to answer questions related to illegal dumping of electronics on the properties they manage. More than 200 managers responded, nearly double the response for a 2011 survey that asked similar questions. Most respondents (78 percent) were answering for state properties.

The over-arching conclusions from the survey are that electronics dumping is still happening on many public lands, it happens fairly frequently and it is costing public land managers money that could otherwise be spent maintaining public lands and improving recreation opportunities. In fall 2014, 60 percent of respondents had seen electronics dumped on the property they manage in the last 12 months. Nearly half of these respondents found a dump once every few months and another 17 percent found dumps monthly. These results are similar to the 2011 survey, when 66 percent of respondents had removed illegally dumped electronics from their properties.

Among the 133 respondents who had found dumped electronics, the most frequently dumped items were CRT TVs (88 percent had found these) and CRT monitors (44 percent). These are also the items that respondents are most likely to have to pay to recycle.

Respondents gave widely varying answers to the open-ended survey question, “How much did the recycling/disposal cost?” Answers ranged from \$10 per visit to a collection site or \$10 per item (with no estimate on the number of visits or items) to guesses on annual costs for recycling. The estimates for annual costs ranged from \$100 to \$500 per year. The majority of sites paid for recycling out of their general operating budgets.

Figure 6: Changes in electronics dumping frequency over time on Wisconsin public lands

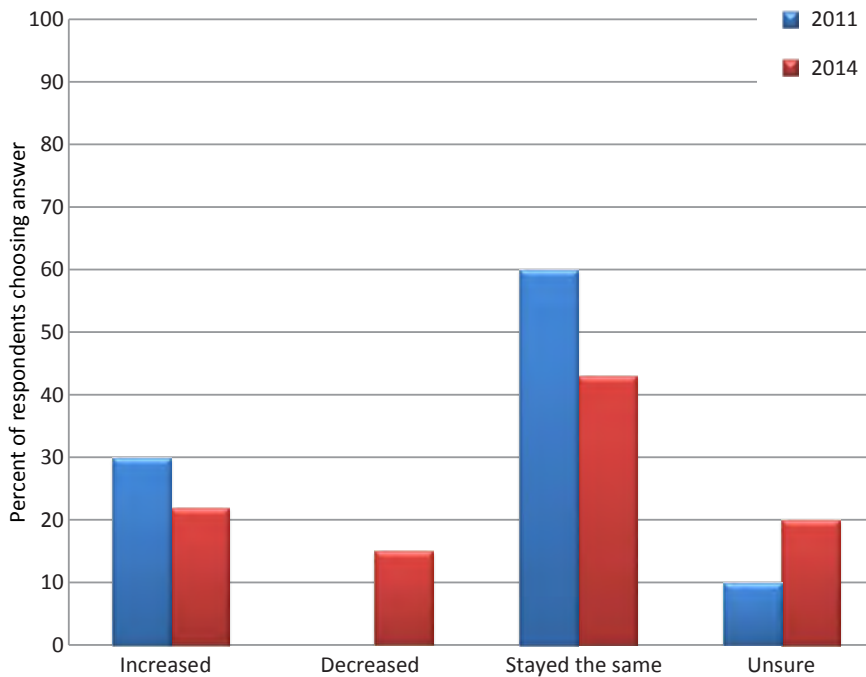
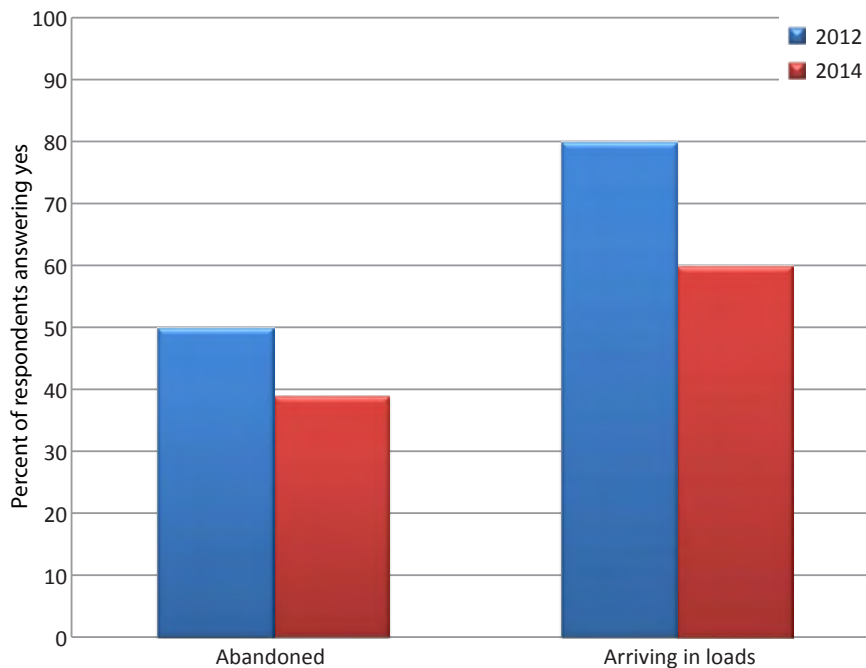


Figure 7: Changes in electronics abandoned and brought in loads at Wisconsin solid waste facilities



It is not clear that the electronics recycling law has had a strong impact on dumping on public lands. Both the 2011 and 2014 surveys asked respondents if electronics dumping had increased, decreased or remained the same since the law went into effect. In 2011, no sites had seen a decrease in dumping since 2010, but in 2014, 15 percent of the 133 sites with dumping had noted a decrease. However, 22 percent of 2014 sites with dumping had seen an increase, and the majority (on both surveys) felt that dumping had remained the same (see Figure 6).

Landfills and transfer stations

Dumping remains a problem at landfills and transfer stations as well, though there may be progress in reducing this. Of the 44 landfill and transfer station operators who responded to the 2014 survey, nearly 40 percent had found electronics illegally abandoned on their properties in the past year, and 60 percent had found electronics in loads. These rates of illegal dumping are lower than found in a similar survey in 2012 (see Figure 7) and reflect the respondents’ belief that overall electronics dumping at landfills and transfer stations has remained the same or gone down since the electronics recycling law went into effect.

Despite the drop in the percent of sites that have found electronics abandoned or in loads, many operators of the sites that had seen this reported finding illegal disposal of electronics more

often. In 2014, electronics were arriving in loads weekly at more than 50 percent of the 25 sites and daily at nearly 20 percent (see Figure 8). All of the sites reporting from the northern part of the state had seen electronics arrive in loads.

As with the public lands survey, most electronics arriving in loads and abandoned at sites were CRT TVs and monitors. In comment boxes at the end of the survey, six respondents wrote that the cost of recycling electronics is a major reason electronics end up at landfills. It is also, according to some, the reason people scavenge copper from old CRTs and other devices before attempting to dispose of them in landfills.

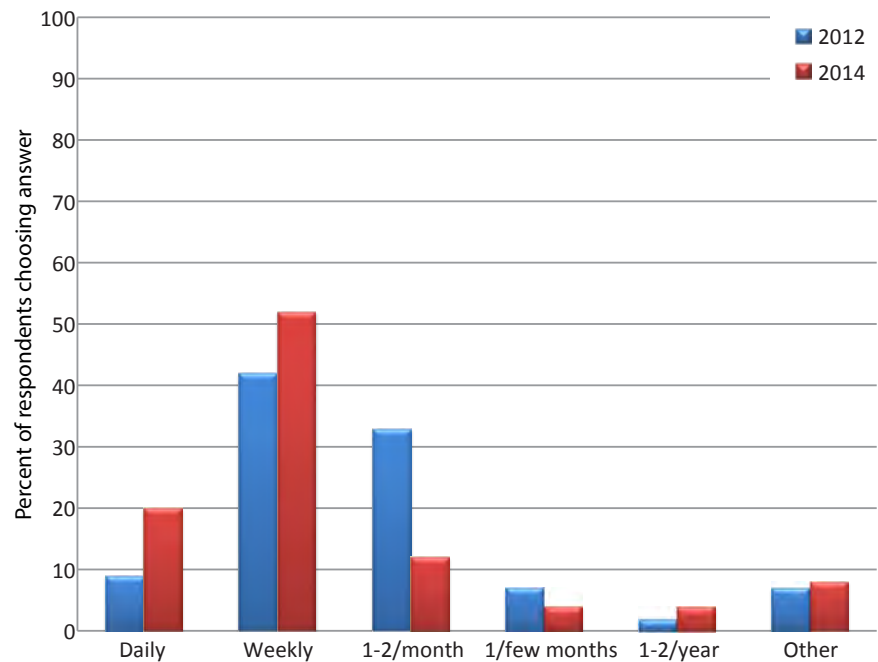
By scavenging, people can earn money from their used electronics, rather than spend money on them. One respondent, who is also an E-Cycle Wisconsin collector, said this problem is likely to get worse as recyclers begin charging more for accepting electronic waste.

Program challenges

In evaluating whether changes might be needed to make the electronics recycling law function better, the DNR has gathered input through surveys of and conversations with participant groups, stakeholders and the public. Collectors, recyclers and other program stakeholders had the opportunity to meet and discuss the E-Cycle Wisconsin program at a May 2014 stakeholder meeting. This meeting focused on the relationship between collectors and recyclers and helped the DNR better understand some of the challenges they are facing. The discussions at the stakeholder meeting helped inform the policy recommendations in this report, as did conversations throughout the year with program participants and other stakeholders.

Wisconsin’s law is designed to operate on free-market principles, with collectors, recyclers and manufacturers conducting private negotiations to set recycling prices. In theory, supply and demand should help find the correct price manufacturers pay for recycling. In practice, decreasing manufacturer targets, combined with steady collection rates of mainly CRT devices and increasing costs for recycling these

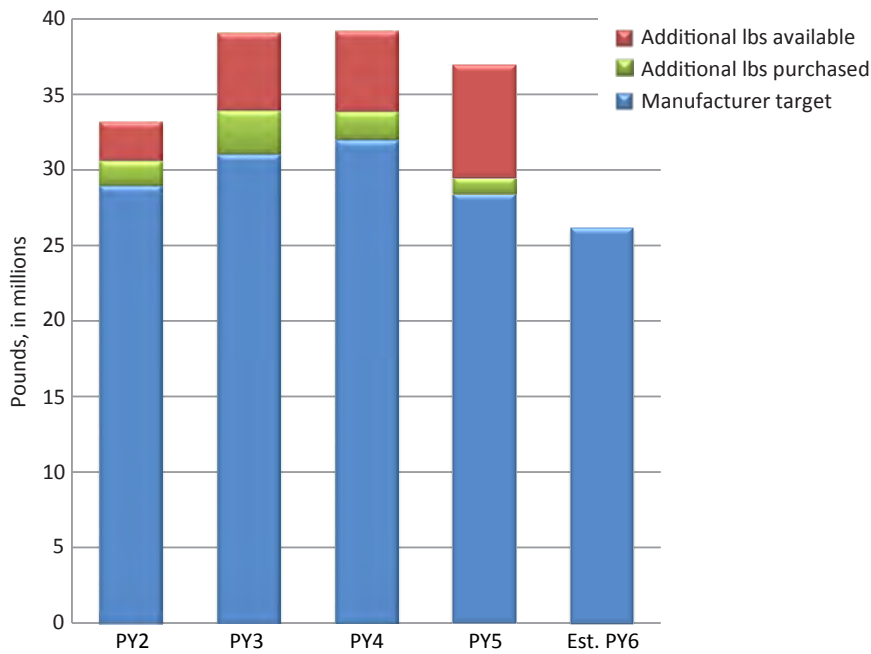
Figure 8: Frequency of electronics being brought in loads at Wisconsin solid waste facilities, over time



Survey results

More detailed reports on E-Cycle Wisconsin surveys are available on the E-Cycle Wisconsin program results page at <http://dnr.wi.gov/topic/Ecycle/wisconsin.html#tabx2>.

Figure 9: Comparison of weight collected and manufacturer targets, by program year



devices, is distorting the market. Without changes, the program likely faces increased costs for recycling, decreased recycling opportunities and greater potential for illegal dumping.

Gap between collection and manufacturer targets

Overall collection has significantly outpaced the overall manufacturer recycling target in program years 3, 4 and 5 (see Figure 9). The program year 5 disparity was particularly large—nearly 7.5 million pounds—because of a decline in manufacturer targets. In addition to an increasing number of pounds not being covered at all by manufacturer payments, this disparity is putting

downward pressure on the price per pound recyclers can charge manufacturers for the pounds that are part of their targets. At the same time, diminishing markets for CRT glass are increasing recycling costs, and revenues recyclers receive for some commodities have declined. This means, according to recyclers, that manufacturers are often not paying the full cost of collection and responsible recycling.

The gap between collection and targets is likely to grow in program year 6 and beyond because of trends in the electronics market. Consumers have been switching from larger, heavier desktop computers to laptops, tablets and smartphones, and manufacturers have found ways to make products such as TVs and laptops lighter. For example, one large TV manufacturer reported the average weight of its TVs has declined by about 5 pounds in recent years—which has a big impact over hundreds of thousands of units sold. Overall sales of some electronics have also declined in recent years, according to the Consumer Electronics Association.

As a result of these trends, the estimated overall manufacturer target for program year 6 is 26.2 million pounds, down from 28.4 million pounds in program year 5 and nearly 32 million pounds for program year 4. The DNR expects the weight of electronics collected for recycling to exceed manufacturer targets under the current formula for at least the next few program years, due mainly to the persistence of CRT TVs in the recycling stream.

When the law passed in 2009, there was no firm information on the amount of electronics that would need to be recycled in coming years. The law set annual manufacturer recycling targets at 80 percent of the weight of covered electronics sold to Wisconsin households and schools, with a provision for adjusting the percentage up or down in the future.

To better balance the weight of electronics that need to be recycled with manufacturer target weights, the manufacturer formula could be modified or replaced. One option would be to change the multiplier used

to set manufacturer targets from 0.8 to 1.0. Another option would be to change the way targets are calculated so they are based on weight collected under the program during previous years. At the beginning of a program year, the DNR would calculate the average weight of eligible electronics received by registered recyclers for recycling over the previous three program years. Using national sales data, the DNR would then divide this total number of pounds among manufacturers based on market share and provide the target weights to manufacturers (something several other states do).

CRT glass costs and concerns

CRT-containing devices make up the majority of weight collected under E-Cycle Wisconsin (see Figure 10 and Table 8). They are also the most difficult and expensive devices to recycle. The high cost of proper CRT recycling has been a major factor in increasing costs throughout the industry.

Based on program data and national research, the DNR estimates CRTs will continue to dominate the weight collected under E-Cycle Wisconsin for another five years, with an estimated 128 million pounds of CRT monitors and TVs still in state households. For comparison, the DNR estimates that approximately 118 million pounds of CRT devices were recycled through E-Cycle Wisconsin during the first five program years, with an average of 27 to 28 million pounds of CRT devices per full program year (see Table 9).

Tightening of CRT glass markets has been widely reported in the electronics recycling industry. The primary options for recycling the leaded portion of the glass include the manufacture of new CRTs (often called glass-to-glass) or sending it to lead smelters. However, only one glass-to-glass furnace is still operating (in India), and there are just a handful of smelting options in North America. Several recyclers are pursuing sending the glass to Spain for ceramic tile manufacturing, and others are pursuing a handful of other options, mainly involving lead extraction. Existing CRT end markets have raised prices and/or reduced the amount of glass they are willing to take in recent years. If

Figure 10: E-Cycle Wisconsin collection by product type

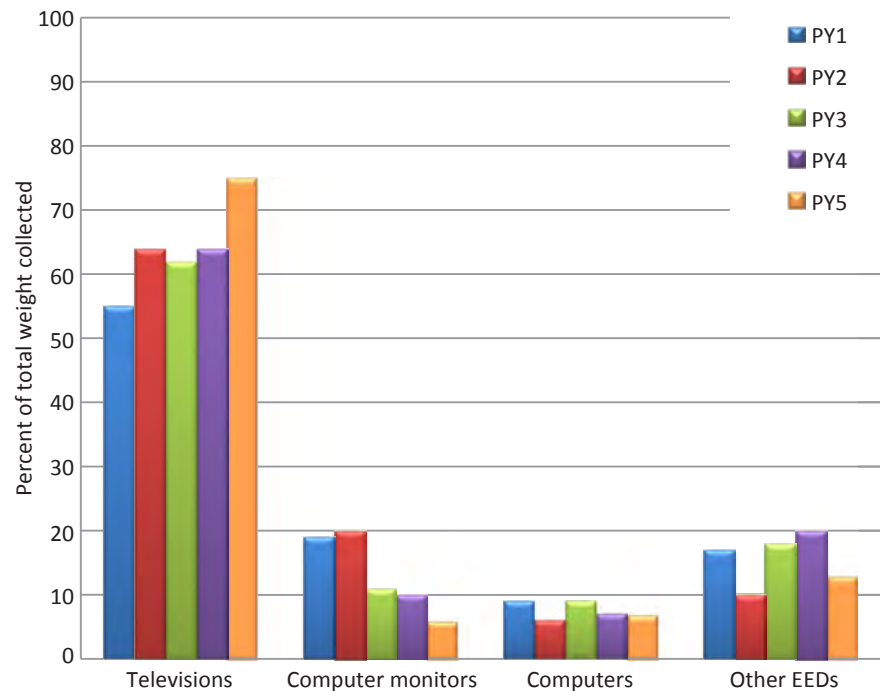


Table 8: Program year 5 collection, by product type

Product type	% of total weight
TVs	75%
Monitors	6%
Computers	7%
Other EEDs	13%

EEDs are eligible electronic devices. Other EEDs include printers, computer accessories, DVD players, VCRs and fax machines.

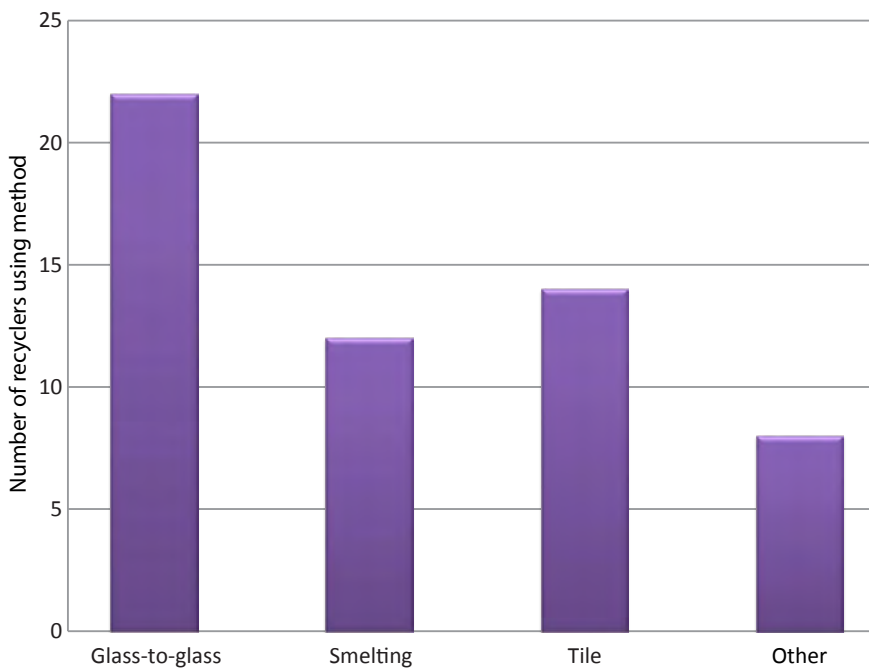
Table 9: Estimated pounds of CRT devices recycled through E-Cycle WI

Program year	CRT TV lbs	CRT monitor lbs	Total CRT lbs
1	5,573,173	1,595,607	7,168,780
2	21,896,050	5,670,892	27,566,902
3	23,594,531	3,469,324	27,063,855
4	24,117,030	3,123,031	27,240,061
5	27,148,640	1,799,992	28,948,632
Total	102,329,424	15,658,806	117,988,230

Based on an assumption that 97 percent of TVs and 81 percent of monitors collected, by weight, were CRT models. These pounds represent the entire device, not just the tube itself. The DNR estimates that Wisconsin households still have approximately 128 million pounds of CRT devices.

A 2014 household survey conducted by the Consumer Electronics Association and analyzed by the National Center for Electronics Recycling found that nearly half of U.S. households still have at least one CRT TV or monitor. NCER estimated that this translates to about 7 billion pounds of CRT devices that still need to be recycled from households nationally, which would mean about 128 million pounds in Wisconsin, based on population.

Figure 11: Current end-market destinations for E-Cycle Wisconsin CRT glass



As of November 2014, most recyclers had not started sending glass to tile manufacturers, but several indicated plans to do so in the near future.

the glass-to-glass furnace shuts down or smelters reduce access further, there would be a glut of leaded glass with few economically feasible recycling options, which could further increase recycling costs.

Most recyclers have multiple outlets for their CRT glass. Currently, nearly all registered E-Cycle Wisconsin recyclers send at least a portion to the glass-to-glass furnace, either directly or indirectly (see Figure 11). Just under half are sending some glass to smelters. More than half are also pursuing the use of the glass in ceramic tiles, either by working directly with tile manufacturers or because they send their CRTs to a recycler that is. A few have been sending glass to other downstream options, including some that are not fully up and running.

The increasing cost of properly managing CRT glass has been a major factor in increasing collector and consumer costs under E-Cycle Wisconsin. The high cost of CRT recycling has also led recyclers in some parts of the country to abandon stockpiles of glass, which then must be cleaned up—sometimes at taxpayer expense. As the gap between manufacturer targets and the weight of electronics collected grows, reduced collection opportunities and higher costs for consumers may tempt some people to illegally dump or landfill electronics. Recyclers facing higher costs and lower manufacturer payments may

also be tempted to stockpile glass or send it to illegitimate downstream markets in order to save money. Improper disposal of leaded CRT glass threatens human and environmental health.

Recycling economics and consumer access

Economic challenges are beginning to have an effect on Wisconsin residents' access to electronics recycling. Decreasing manufacturer targets and increasing CRT recycling costs have been the primary reasons for recyclers dropping collection sites and increasing charges to collectors (a change from previous program years, when many recyclers paid collectors). This is leading some

collectors to drop out of the program, limit or stop TV collection, or increase charges to consumers. Many of these changes have come during the first few months of program year 6 (July through October 2014).

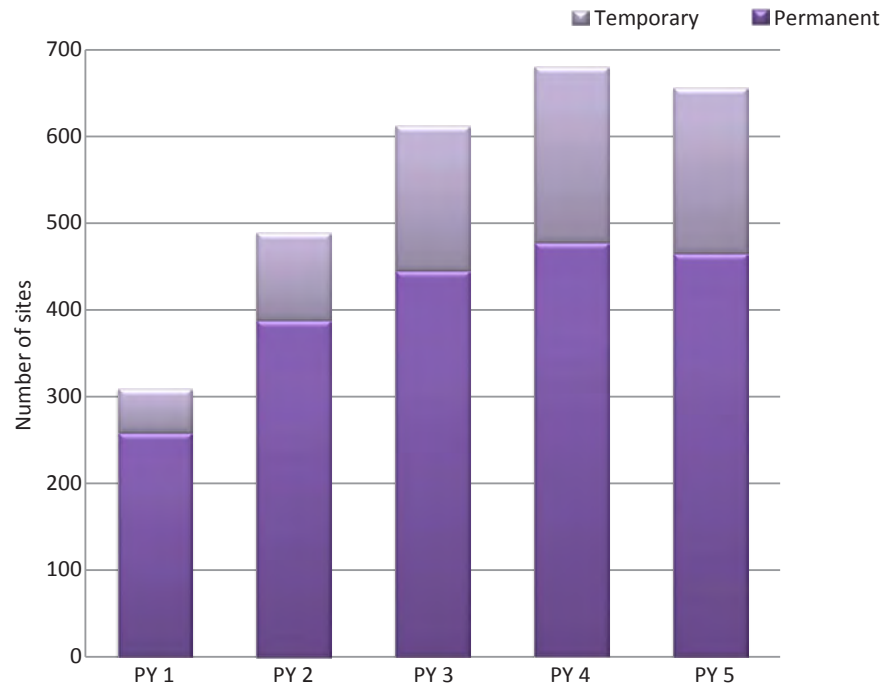
As shown in Figure 12, the number of collection sites registered with E-Cycle Wisconsin steadily increased through program year 4, but then began to decline. There was only a slight drop from program year 4 to 5 (4 percent fewer sites in program year 5). In program year 6, however, due to the changing economics of the program, many more collection sites have either been dropped by their recyclers or decided not to continue under the program.

As of October 2014, there were approximately 390 permanent collection sites registered with E-Cycle Wisconsin, about 60 fewer than October 2013. Based on what several recyclers have told the DNR, we also expect the total number of collection events for program year 6 to be down substantially from the 191 held during program year 5.

The reduction in collection opportunities will likely affect residents in rural areas the most. All of Wisconsin's 72 counties except Florence have had at least one permanent collection site or collection event since the program began in 2010. In many of the state's more rural areas, though, these collection opportunities have remained few and far between. While the 39 counties designated as "rural" under the law represent about 16 percent of the state's population, during the first five program years between 9 and 13 percent of pounds collected came from those counties. This makes it difficult for residents to find responsible, affordable recycling options, particularly for older TVs.

Recycling opportunities—especially for older TVs—are also declining in urban areas. For example, Goodwill Industries of Southeastern Wisconsin, which has more than two dozen locations in 11 counties, has decided to stop accepting TVs beginning in January 2015 because of the high cost of proper recycling. These locations had been accepting TVs for free and recycling a large volume each year. Many residents in

Figure 12: Registered collection sites over time



that part of the state will no longer have access to free or low-cost TV recycling, and many residents will likely turn to local government collection sites, which also struggle with recycling costs.

The current rural collection incentive allows manufacturers to count 1.25 pounds for every pound collected in a county designated as rural under the law. One way to ensure residents in rural parts of Wisconsin continue to have access to electronics recycling opportunities would be to replace the current rural incentive with a requirement that manufacturers meet at least 15 percent of their annual recycling targets with weight collected from the counties designated as rural under the law. Because manufacturer credits are not tracked by urban/rural weight, manufacturers could still apply credits to any shortfall, either an overall shortfall or a shortfall in rural pounds.

If a change like this were made, additional counties (such as Douglas, Grant and Marinette) could be added to the current list of 39 counties considered rural under the law, because of they have very rural areas and are farther from recyclers and major transportation corridors than other urban counties, leading to high shipping costs (see map in Appendix B).

Access to convenient and low-cost recycling options has been one of the biggest successes of the electronics recycling law. Wisconsin has had one of the highest numbers of collection sites per capita among states with similar laws. Smaller manufacturer targets and increased cost of CRT recycling are reducing this access and will potentially lead to increased electronics dumping unless changes are made.

Recommendations

Based on the successful first five years of implementation and continued positive feedback from stakeholders, the DNR believes the fundamental elements of Wisconsin's electronics recycling law are sound. The changing nature of electronics and changes in the electronics recycling industry, however, are producing the challenges discussed above and threaten to reduce Wisconsin residents' access to electronics recycling. Pages 16-17 and 19-20, above, discuss these challenges and associated policy implications.

Change in program year dates

One additional cost issue that many stakeholders have brought up is the timing of E-Cycle Wisconsin's program year (July through June). In many cases, contracts and pricing agreements among collectors, recyclers and manufacturers change at the beginning of a new program year. Since many of them—especially local governments and manufacturers—do their budgeting on a calendar year basis, this makes it hard for them to anticipate and manage pricing changes that happen in the middle of the calendar year.

To better match the budget cycles of program participants, the annual program year should be changed so that it corresponds to a calendar year (Jan. 1 to Dec. 31), rather than the state fiscal year. This would require switching the annual report/re-registration deadline for collectors and recyclers to Feb. 1 and for manufacturers to March 1, switching the recycler mid-year report deadline to Aug. 1, and changing the due date of this report to July 1. One possible way to accomplish the transition would be to have program year 7 run from July 1, 2015, through Dec. 31, 2016, with manufacturer targets adjusted accordingly.

Adding covered entities

Currently, E-Cycle Wisconsin includes K-12 public schools and private schools participating in the Parental School Choice Program in Milwaukee and other districts. Making all K-12 schools eligible under E-Cycle Wisconsin would be a more consistent approach, make outreach simpler and provide recyclers with

another source of potentially higher-value material (more IT equipment than in the residential mix, which could help lower overall recycling costs).

The DNR recommends modifying the definition of “school” under s. 287.17(1)(np) to allow all K-12 schools in Wisconsin to recycle electronics through E-Cycle Wisconsin.

Manufacturer registration fees

The graduated fee system (\$0 if fewer than 25 covered devices sold in Wisconsin; \$1,250 if 25 to 249 devices sold, and \$5,000 if 250 or more devices sold) has generally worked well. Through communications with retailers, however, the DNR has found that many small electronics retailers are still manufacturing a small number of desktop computers under their own brand. While some are below the 25-unit threshold, others may be slightly above this and thus might have to pay a registration fee that is relatively large per unit sold. If the threshold for not paying a registration fee and the reduced fee level were raised, it could encourage compliance among smaller manufacturers and make the per-unit costs more equitable.

The DNR recommends changing registration fee levels in s. 287.17(4)(b) to the following:

- \$5,000 if the manufacturer sold 500 or more covered electronic devices in this state during the last program year.
- \$1,250 if the manufacturer sold 250 to 499 covered electronic devices in this state during the last program year.
- \$0 if the manufacturer sold fewer than 250 covered electronic devices in this state during the last program year.

Adding covered devices

The DNR believes smartphones and video game consoles being sold today meet the definition of consumer computer under s. 287.17(1), and are thus covered electronic devices, though older versions of cell phones and game consoles may not. It would simplify matters for collectors, recyclers and manufacturers if the Legislature would explicitly add cell phones and video game consoles as covered electronic devices under the law, and thus include them in manufacturer obligations.

In addition, portable DVD players are very similar to other video display devices, but the definition of “video display device” under s. 287.17(1) does not seem to cover them. Most other states with similar definitions, including Minnesota, have chosen to include portable DVD players in their list of covered devices, and several manufacturers have tried to register the players with E-Cycle Wisconsin. The DNR recommends explicitly adding portable DVD players to the definition of video display device.



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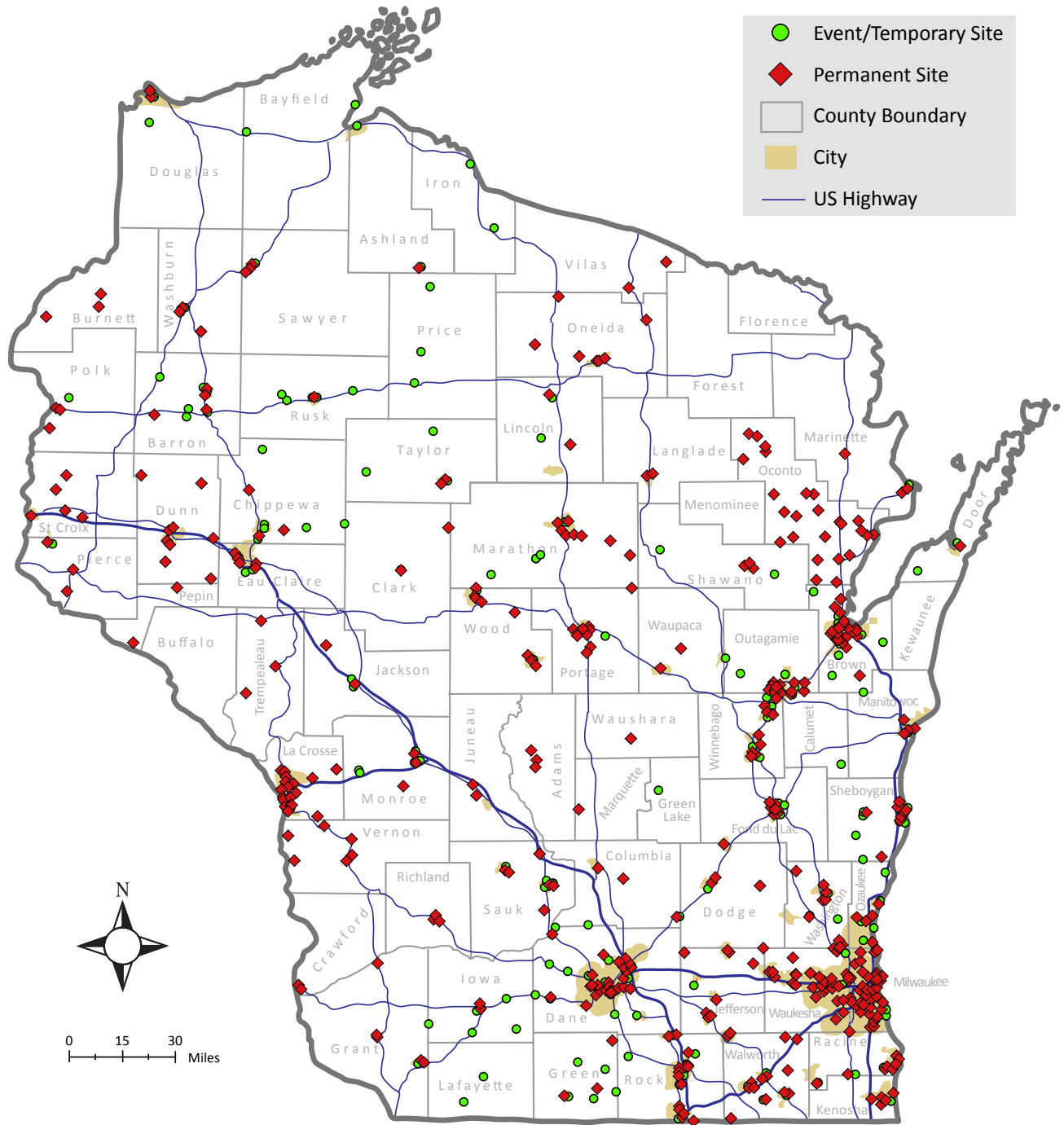
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Appendix A: Map of collection sites registered under E-Cycle Wisconsin during program year 5



Revised: November 12, 2014

Appendix B: Map of urban and rural counties under E-Cycle Wisconsin

