

# MICHIGAN ELECTRONIC WASTE PROGRAM SUMMARY REPORT

Part 173, Electronics, of Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, AS AMENDED (PART 173)



### **EXECUTIVE SUMMARY**

Michigan's electronic recycling law was passed in 2008 as a means to address growing concerns about the large number of consumer electronics that were entering the market and the waste stream. Many of these electronics contain harmful toxins, and in 2009 the law was implemented to properly manage these devices and help protect the public from potential release of these toxins. Part 173 aims to protect human health and natural resources through sustainable materials management practices throughout the state. Since 2011, the law has been responsible for the recycling of over 125 million pounds of end of use electronics. The electronic recycling law places the role of steward onto manufacturers of electronic devices. Through this program, the state is able to support functions such as:

- · Keeping harmful toxins out of the water
- Preventing toxic air pollution
- Decreasing demand for harvesting virgin material
- Diverting commodities from landfills
- Promoting recycling in Michigan

What types of toxins are in Covered Electronic Devices (CEDs)?

- Lead
- Mercury
- Cadmium
- Silver
- Flame Retardants

### REGISTRATIONS

The electronic recycling law requires manufacturers of **"covered electronic devices"** that are sold primarily to consumers and small businesses to register with the DEQ each program year, and implement an electronic takeback program. Manufacturers of computers must take back at least their own brand, while manufacturers of televisions, defined under statute as video display devices (VDDs) must take back any brand of their covered device. Recyclers must register with the DEQ, and follow a set of operational guidelines referenced in Section 17315 in accordance with environmental, health, and safety considerations. Program Years (PY) follow state of Michigan Fiscal Year and begin on October 1 of one year and end on September 30 of the following year. For example, PY 2016 dates from October 1, 2015 to September 30, 2016.

### What is a CED? (Covered Electronic Device)

Includes personal and small business:

"Covered Computers"

- Computer
- Printer
- 3D Printer
- Monitor
- Tablet

"Covered Video Display Devices"

Televisions

### Michigan Program Averages:

- 75 manufacturers
- 26 recyclers

Registered with the Department each program year.



Figure 1: Total manufacturer and recycler registrations from 2011 to 2016.



# **Manufacturer Registrations**

Figure 2: Video Display Device manufacturer and "Other" manufacturer registrations from 2011 to 2016.

Registration numbers started off with a general increase each year of registered manufacturers and recyclers. There was a slight drop in the number of registrations in 2013, however, and PY 2015 and PY 2016 occurred during an economic downturn of value for recyclables, which is in part why registrations also decreased during these program years. The increase in popularity of smaller devices that have not always been covered by the program such as cell phones and tablets may also have influenced the decrease in the number of registered total and video display device manufacturers. Since smartphones are not defined as covered electronic devices, and tablets were only recently interpreted to be covered, these types of manufacturers may not be registering at the same rate as manufacturers of video display devices and computers were in previous Program Years, even though the amount of smaller device manufacturers registering has been increasing.

The number of VDD manufacturers registered with the DEQ from PY 2011- PY 2014 was still consistently greater than manufacturers of "other" electronic devices such as computers and printers However, beginning in PY 2015 and continuing into PY 2016, the number of registered VDD manufacturers was surpassed by manufacturers of "other" electronic devices. This could be in part because of the increase of small manufacturers beginning to register, such as tablet and 3-D printer manufacturers.

### **REGISTERED YEAR TO DATE TABLET ONLY MANUFACTURERS**



Figure 3: Registered manufacturers with only tablets as their covered electronic devices vs. total registered manufacturers from PY 11 to PY 16.



Figure 4: Registered manufacturers with vs. without a tablet as one of their CEDs.

In PY 2016, almost 20% of all manufacturers that registered with the DEQ registered a tablet as their only covered device. The number of tablet-only registered manufacturers has continued to increase each program year, and this trend is expected to continue into upcoming years. In PY 2016, almost half of all registered manufacturers listed a tablet as at least one of their covered electronic devices.

# ELECTRONIC TAKEBACK PROGRAM

Under Part 173, registered manufacturers must implement a free and convenient takeback program for consumers and small businesses. Since 2012, manufacturers in the Michigan program on average have recycled over 21 million pounds of electronic waste each year through the program.



Figure 5: Total pounds recycled in 2011 through 2016 by registered manufacturers and registered recyclers.



#### Recyclers have requirements under the statute as well, and are affected by the implementation of the electronic takeback program. "Recycler" is defined in the statute as entities that are sorting and processing materials to facilitate recycling or resource recovery techniques, such as dismantling a CED for any reason other than data security. Beginning in PY 16 recyclers were asked to specify the standards they were maintaining in order to meet management practices. These standards often include ISO 14001, SERI-R2, and R2-RIOS. The electronic takeback program directly involves recyclers because of the collaboration of manufacturers under the program with them to recycle their covered electronic devices.

Mailback programs

**Drop-off locations** 

**Collection sites** 

Collection events

## **MARKET IMPACTS**

Total annual pounds recycled by manufacturers and recyclers under the electronic recycling program and Ewaste law likely were influenced heavily by the decrease in markets for recyclables as well. Pounds recycled from both manufacturers and recyclers increased each year from the onset of the Ewaste program until PY 15 when the commodities markets experienced a sharp downturn. CRT Television glass proved to be especially difficult to recycle and manage because the lead contained within the glass makes it unable to be processed along with other glass, and even clean glass has had its own market difficulties. Additionally, the world recycling market for this material changed significantly in 2014.

The CED related commodity price decline has helped lead to an overall decrease in the amount of material collected and recycled because it often costs more to dismantle and recycle CEDs than the actual commodities within them are worth. This has reduced convenience for the residents of Michigan because CED recycling options have therefore decreased.

VDD manufacturers consistently have had a higher percentage of the total registrations participating in some kind of recycling and takeback program. Within Part 173, VDD manufacturers were given a nonbinding target goal of recycling 60% of the total weight of covered devices sold in the previous program year. Computer manufacturers and manufacturers of other covered electronic devices such as printers do not have a goal. Active participation (manufacturers reporting amounts recycled other than "0") has been consistently higher for VDD manufacturers. This response rate may be in part credited to the nonbinding goal given to them under the statute.



# **Manufacturer Participation**

Figure 7: Rate of participation (manufacturers reporting they recycled any amount of CEDs through a takeback program from 2011 to 2016).

### **PROGRAM EFFECTIVENESS AND PARTICIPATION**

In 2015, over 20 million pounds of electronics were recycled through the electronic takeback programs by registered manufacturers. This peaked in 2014 with just over 30 million pounds recycled in a single program year under the program. To assist with assessment of the program participation efforts, beginning in PY 2016, part of the registration form asked recyclers to indicate what types of devices they recycled for manufacturers in the program. This helped indicate how many pounds were actually being recycled through the Part 173 requirements, and to which extent specific manufacturers and recyclers were participating. This data indicated that there was over 3 million pounds of extra CED weight that was recycled that could have been supported under a takeback program but was not.



### Amount Recycled (lbs) in Michigan

Figure 8: Pounds reported as recycled by manufacturers, pounds reported as recycled by recyclers, and pounds specifically reported by recyclers as recycled for a manufacturer takeback program from 2011 to 2016.



Although the program has helped improve electronics recycling in Michigan, there are many challenges associated with the ongoing implementation of this statute. On page 5 of this report, the "World Markets" section discusses how markets have impacted manufacturer efforts.

Another challenge to increasing electronic recycling amounts is the cost of landfilling versus recycling in Michigan. Currently, Michigan has no landfill ban on electronics, and has the lowest landfill tipping fees out of the entire Great Lakes states/ Midwest region. Michigan also has the largest amount of available landfill disposal capacity throughout the region. With low disposal costs, reduced commodity values, and high landfill capacity, it is generally less costly to landfill unwanted electronics rather than collect and recycle them. All of these factors create economic challenges for manufacturers who participate in the takeback program. A recent study funded by DEQ identifies that 2.5% of the Michigan municipal solid waste stream is recyclable electronics, which is also higher than any other Great Lakes state.



Figure 10: Amount of pounds recycled in 2011 through 2016 that were video display devices.

Since the program began in 2010, the DEQ has learned that difficulties with processing certain electronic waste has contributed to a large portion of the electronics waste stream being landfilled and has resulted in many cases of materials being improperly managed and disposed. For example, CRT Televisions have been the largest percentage of the electronics waste stream to date. However, CRT Televisions are difficult to dismantle even with proper equipment and staff, and unregistered recyclers often disassemble these televisions to recoup the recyclable components using poor techniques that can lead to the release of lead and other toxins into the air, soil, and groundwater.

CRTs and other VDDs make up approximately two thirds of the devices recycled under the electronic takeback programs registered with the DEQ. This is significant because CRTs are expensive to recycle and difficult for community collection programs and recyclers to handle. Fostering a program that helps eliminate the improper end of life management of these types of devices can help minimize the risk for negative environmental consequences.

As stated earlier in this report, the significant number of televisions recycled to date may be due in part to the statutory requirements. Section 17311 of Part 173 establishes a nonbinding goal for VDD manufacturers and describes the requirements of the takeback program. VDD manufacturers are required to take back any brand of television, not only their own covered brands. Computer and other CED manufacturers, on the other hand, are only required to take back their own brand in their takeback program.

Figure 10: Amount of pounds recycled in 2011 through 2016 that were video display devices.

Figure 10 demonstrates the amount of VDD pounds recycled peaked in 2014 and has since decreased. The DEQ believes this is attributed to three issues: the average weights of electronics are decreasing causing manufacturers to have fewer pounds to recycle as their nonbinding goal; fewer companies manage the material under the program; and overall poor economics of recycling this material. Heavy CRT televisions continue to be a large part of the waste stream. Recent national estimates (2015) suggest there are 4-5 billion pounds of CRTs still in households and small businesses. In addition, 80% of the material in CRT televisions has no commodity value. Because of this and other factors, many recyclers are now charging consumers to recycling their CRT televisions.



Figure 11: Abundance of materials in CRT Televisions and other CEDs included in the manufacturer takeback program.

# **REPORTING CHALLENGES**

Another issue impacting the effectiveness of Michigan's electronic waste program is the difficulty of determining just how successful the program is. Currently, there are minimal reporting requirements for manufacturers and recyclers. Starting in PY 2016, however, registration forms were changed to break down the reported data to obtain more specific information regarding types of devices collected and recycled by manufacturer takeback programs.

Data is broken down to distinguish between types of pounds recycled (VDD vs. computer pounds, etc.) and the amount of material associated with Manufacturer supported takeback program.



Figure 12: Amount of pounds recycled under the takeback program for video display device manufacturers vs. computer/"other" manufacturers.

The Michigan program does not require collectors to register or report on the material being handled. Part 173 defines a "computer" in Section 17301 as a desktop personal computer or laptop computer, a computer monitor, and a printer. Manufacturers of any covered device other than a video display (television) device would be considered a "Computer Manufacturer" for the purpose of this and other graphs. However, some VDD manufacturers may also manage other devices besides televisions as one of their covered electronic devices.

The continued reduction in weight of modern electronic devices has contributed to a decrease in the amount of pounds being recycled by manufacturers because their target goal of 60% of the pounds of total sales from the previous year keeps getting smaller. Part 173 asks that manufacturers recycle older, heavier television models that continue to make up much of the waste stream.

The same decreasing trend of VDD recycling rates has been seen in other states in the Midwest region and throughout the country. Wisconsin, for example, saw an 18% decrease in the collection of eligible electronics from their program from Year 5 to Program Year 6. Their Ecycle program also cites smaller and lighter electronics as a larger contributor to the decline of recycled pounds by manufacturers because it leads to a decrease in the target recycling weight. Indiana experienced a similar trend with a decrease of about 1 million pounds being recycled under their program from the most recent program years. However, in Michigan, Figure 12 demonstrates that there is a significantly larger amount of VDD Manufacturer pounds being recycled than computer manufacturers. This net difference could largely be impacted by the fact that VDDs still generally weigh more than devices that computer, tablet, and printer manufacturers sell. Therefore, their goal would be higher, and the amount of pounds they recycle would also be more.

Finally, lack of clarity in what qualifies as a Covered Electronic Device and what does not has led to problems since the inception of the program. There is currently a lack of consensus on whether devices such as tablets, smartphones, and most recently, 3D printers, are covered electronic devices that require manufacturers to register and develop a takeback program. Some manufacturers of devices such as tablets and 3D printers are small companies and have alleged that registration fees and takeback programs would place a large financial burden on the company. Currently, there are 14 manufacturers registered that are tablet-only manufacturers, meaning they do not manufacture, sell, or import any other types of covered electronic devices. There are 18 additional manufacturers that manufacture tablets, but have other covered electronic devices included in their registration as well.

In the spring of 2015 the Department started a stakeholder process to evaluate Part 173 and identify necessary changes in the law. The suggested legislative amendments that came out of that process will address the lack in reporting on collection and recycling activities; require more details from manufacturers on how their takeback programs work and the areas they serve; require a focus on collecting material in rural areas; and require recyclers to have financial assurance for their facilities, among other things to better protect human health and the environment.

# **COMPLIANCE EFFORTS**

Although the goals established in Part 173 are non-binding for manufacturers, the DEQ still places emphasis on the importance of working to meet these goals. However, as seen in Figure 13, a majority of VDD manufacturers do not meet their nonbinding recycling goal each Program Year. For the first few Program Years of the program, the compliance rates (manufacturers recycling 60% of the weight they sold in the previous Program Year) increased but have since decreased since PY 2014.



Figure 13: Percentage of weight sold that was recycled by manufacturers in 2011 through 2016. Segments highlighted in green represent those who met or exceeded the 60% target goal.

In general, over the past six program years, the largest percentage of VDD manufacturers have recycled between 0% through 40% of their goal. The number of manufacturers recycling 60% of their goal or greater peaked in 2013, and then generally decreased. PY 15 shows the largest percentage, almost half, of registered manufacturers reporting 0% of their target goal being recycled in their takeback program.

The DEQ instituted a targeted outreach program to VDD manufacturers in 2015. Figure 14 suggests that this effort may have positively influenced the increase in the number of compliant manufacturers observed in 2016.



Figure 14: Rate of video display device manufacturers that were in compliance (meeting or exceeding 60% recycling goal) from 2011 through 2016.

The outreach program efforts involved making contact with VDD manufacturers who have not met their nonbinding recycling goals and reminding them of the importance of the program and the requirements of the statute. In addition, in early 2016, Certificates of Appreciation were also sent to the VDD manufacturers who did meet or exceed their target goal.

The DEQ is working to address recyclers who are uncertified and unregistered with the state. These recyclers often stockpile electronics materials in hopes that the recycling market will improve, and processed materials may be sold for higher amounts. However, the improper storage and processing of electronic waste is a violation of Part 173 and Part 111, Hazardous Waste Management, of the NREPA, because of the potential for the release of hazardous substances to the air, land, and water. Site visits are conducted throughout the year to determine if recyclers are in compliance with the requirements of the program. When problem recyclers are discovered, it can require significant compliance assistance/enforcement effort and cost to resolve violations.

Program coordinators also meet with new and upcoming recyclers to help them be part of the program and have a successful start-up. Finally, coordinators meet with communities to discuss the common issues with electronics recycling, conflicts communities may have because of these issues, and sustainable ways to manage and mitigate these issues, such as charging higher recycling fees on collection days to cover the higher costs associated with recycling electronic consumer goods such as CRT televisions.

Online and in-store shopping research was conducted to discover unregistered brands and their manufacturers, and to work with the manufacturers to come into compliance with the registration requirements.

In the future the DEQ hopes to increase the number of manufacturers registered and in compliance with the takeback requirements under Part 173. Another objective is to increase consumer awareness of sustainable options to recycle electronic devices through various education and outreach activities. One of these efforts includes use of the new DEQ Recycle Search website, where Michigan residents can search for recycling locations near them by material and location.

Data in this report was as of March 2016 and is subject to change. 2010 data is available upon request, but was excluded from this report because of a lack of complete information. Michigan's Ewaste program was implemented beginning in 2010, and therefore data for many manufacturers and recyclers was not collected until 2011.

### THE PATH FORWARD

In early 2015, DEQ began a process of updating Part 173. While the basics of the law were still effective, changes in the electronics industry and the recycling industry necessitated updating the law. The intent of the law continues to encourage proper recycling of covered electronic devices, but there are items within the law that create functional impediments to the takeback program and need to be changed.

A stakeholder process was implemented in early 2015 to work through the process of updating the law. At the end of the process, the main changes needing attention included:

- More effective reporting from manufacturers concerning their takeback program efforts across the state.
- A collector registration program to allow the DEQ to assess takeback convenience for residents of the state.
- Updates to the recycler operational requirements to include bonding requirements to assure the DEQ's ability to cleanup abandoned material.
- The ability for the DEQ to support local communities collection efforts through grant programs.
- Removing the requirements that the program has to be "free."
- A general update of terms and definitions within the law.

This stakeholder process also identified that work was needed by the DEQ to clarify regulatory authority over electronics recyclers that might operate outside of the parameters of Part 173, but within the scope of recycling consumer electronics. Regulatory overlap between Part 111 (Hazardous Waste), Part 115 (Solid Waste) and Part 173 (Electronics) needed to be addressed to create clear regulatory authority over businesses that generate, transport, and recycle consumer electronics. Stakeholders who participated in this process included representatives of electronics manufacturers, electronics recyclers, local government, environmental groups and state government.

Legislation to address the issues was introduced in early 2016, but did not move forward. Assuring the necessary updates to the law are addressed and implemented remains a priority for the department.