

WHITE PAPER ON MANAGING PENNSYLVANIA'S ELECTRONIC WASTE

Recycling today's electronic devices for tomorrow's technology

Despite the enactment of the Covered Device Recycling Act (CDRA)¹ in 2010 that arranged for manufacturer-sponsored recycling, many Pennsylvanians are frustrated by their inability to conveniently and affordably recycle used electronic devices (covered devices). With insufficient recycling options available, the result is many covered devices, mostly televisions, are being illegally dumped and stockpiled across the Commonwealth of Pennsylvania. They can be found at municipal buildings, along roadsides, and even on river banks.

The current statutory scheme for covered devices does not provide all residents with proper disposal options as electronic waste collectors are not required to be available for the entire year and do not find it profitable to operate in many parts of the state. At the same time, it is illegal to dispose of electronics in landfills. This combination has exacerbated the unintended consequence of illegal dumping, which contributes to neighborhood blight, pollutes soil and groundwater, and can pose health risks to residents.

The CDRA requires all manufacturers of covered devices to provide for the collection, transportation and recycling of these devices at no cost to consumers. The amount that manufacturers are required to collect as established in the CDRA is based on the weight of covered devices sold to consumers two years prior to the year for which the weight is being reported. New electronics are getting lighter, while old electronics, such as cabinet-style televisions, are very heavy in comparison. This enables manufacturers to satisfy their collection obligations by

collecting only a fraction of all the old electronics that residents want to dispose.



Manufacturers tend to focus on recycling the more valuable computer equipment while limiting the number of costlier items, such as televisions, that they accept. This has forced local governments to continue to expend funds to offset these costs for their residents and, in some cases, curtail programs. Many Pennsylvania recycling businesses are concerned about their ability to stay solvent under this law due to the

Source: PA Department of Environmental Protection

¹ Act 108 of 2010, 35 P.S. § 6031.101 *et seq.*

low prices paid by the manufacturers for covered device recycling. For these reasons, the statutory requirements need to be updated.

Through its experience implementing the law and numerous conversations with stakeholders, the Department of Environmental Protection (DEP) has identified appropriate solutions for this problem. This white paper explains the issues with the Covered Device Recycling Act in more depth and suggests solutions that can be used in a future amendment to the statute.

Background

The Global Problem of Waste Electronics

Illegal dumping of electronics is not unique to Pennsylvania. It occurs across the United States and the globe. Twenty-five states and the District of Columbia have statutory laws governing the recycling of electronics. Some require manufacturers to establish takeback programs, while one requires consumers to pay a fee that can be used to support recycling. Others allow recyclers to bill manufacturers directly for the amount or weight recycled.

Globally, the United Nations is advocating for design principles that contemplate safe disassembly.² The European Union has a set of laws that requires collection of at least 85% of waste electronics by 2019. The United Kingdom, Germany, Norway and Japan all require recycling, and Taiwan has been assessing fees to fund electronics recycling. Countries that serve as recipients of waste electronics are working together to develop safer and more efficient methods of recycling for the benefit of their own residents.

Possible Health Impacts of Waste Electronics

Electronics can be costly to recycle because they are often not designed to be disassembled, and the chemicals they contain require careful processing as many of them are hazardous. Low global commodity values also contribute to the high cost of recycling. As a result, the collection and recycling of electronics requires a different process than ordinary recyclables such as plastic and cardboard.

One of the most challenging covered devices to recycle, both in terms of hazardous materials and profitability, are televisions that contain cathode ray tubes made of glass infused with lead. It is estimated that on average a cathode ray tube (CRT) television contains four pounds of leaded glass that poses a threat to public health when discarded. Lead poisoning can cause neurological problems, learning



Source: PA Department of Environmental Protection

² United Nations Environment Management Group, 2017. *United Nations System-wide Response to Tackling E-waste*.

disabilities, mood disorders and pregnancy complications. Young children are especially vulnerable to its effects.

CRT televisions can be quite large and heavy. These devices can sometimes weigh over 100 pounds, which makes transportation to recycling facilities very costly in comparison to the low value of the material recovered. As a result, most recycling sites have limited or eliminated CRT collections. Adequate global capacity to recycle the leaded glass contained in the televisions exists, although often at a price unattractive to manufacturers. While it is difficult to have an impact on global CRT markets, the Department can assure that material captured in its program is recycled responsibly.

Newer flat-screen televisions and monitors contain mercury, which is also hazardous and can leak and become airborne.³ Mercury can cause neurological problems, such as degraded motor skills and impaired speech. These units contain fragile mercury bulbs, which must be handled delicately. Disassembly is often time-consuming and done by hand, which increases the cost of recycling. Nearly every other type of electronic device contains some amount of unsafe material, such as cadmium, chromium, or polychlorinated biphenyls (PCBs) from plastics.

Effects on Residents and Local Governments

In addition to posing a health hazard, illegal dumping contributes to blight effects in neighborhoods. The cost of cleaning up illegal dumps has been estimated at nearly \$619 per ton.⁴



Source: PA Department of Environmental Protection

This can present an ever-growing financial obligation for local governments. Furthermore, large piles of waste have a negative effect on property values for the surrounding homeowners and discourage commercial development.

Research shows that where dumping becomes common, more dumping is likely to occur. Presently, there are at least 7,000 illegal dump sites across every county in Pennsylvania.⁵ The vast majority of illegal dump sites are located in rural counties, but the distribution of electronics among these sites is roughly equal between rural and urban counties.⁶ In both areas, CRT televisions are often broken for access to their “yolk,” a component that contains the metals that constitute the recycling value of the unit. The leftover shell is not only worthless to recyclers, but also poses a more serious environmental and safety threat given possible breaching.

³ Recycling Markets Center, February 2016. *Health and Safety Issues with Electronic Scrap Recycling* (webinar). Available at <http://www.pennrmc.org/electronics-scrap/>.

⁴ MSW Consultants, August 2014. *Keep Pennsylvania Beautiful: Statewide Illegal Dumping Cost Research*, p. 4. Available at <http://www.keppabeautiful.org/wp-content/uploads/2016/09/KPB-Statewide-Illegal-Dumping-Cost-Research-Final-8-20-2014.pdf>. This cost was calculated as an average for all types of illegal dumps, because it is rare that waste electronics are dumped by themselves.

⁵ Nestor Resources, June 2014. *Illegal Dumping in Pennsylvania: A Decade of Discovery*, pp. 16, 29. Available at <http://www.keppabeautiful.org/wp-content/uploads/2016/09/KPB-Recommendations-August-2014.pdf>. This count pertains to all types of illegal dumps. Electronics are found in approximately 20% of dump sites.

⁶ Center for Rural Pennsylvania, November 2009. *An Analysis of Illegal Dumpsites in Rural Pennsylvania*, pp. 2-3.

This issue also affects residents on an individual level. For many who live far away from electronic waste collection sites, the most responsible thing to do is stockpile old electronics inside the home. When residents are left with no viable option to dispose of waste that could potentially be hazardous, the impression can be created that the government is not working for them.

Pennsylvania's Current Policy

Statutory Requirements

The CDRA requires the manufacturers of covered devices⁷ to register with the Commonwealth and create covered device recycling programs. Disposal of covered devices in landfills was banned in 2013. The statute established a comprehensive regulatory program to oversee recycling activities based on the manufacturers' plans.

For permission to sell covered devices in Pennsylvania, manufacturers must register with DEP, submit a registration fee, and submit a plan to collect, transport and recycle their share of waste electronic devices. The registration fee is used to support DEP's administration of the covered device recycling program. No manufacturer may charge a fee to consumers for the collection, transportation or recycling of a covered device. The manufacturer's collection requirement established in the act is based on the weight of covered devices sold to consumers two years prior to the year for which the weight is being reported. Every year, manufacturers with an approved recycling plan must submit an annual report showing the weight recycled during the preceding year.

Other entities besides manufacturers have obligations under the act. Retailers must confirm that a manufacturer is on the list of registrants before offering its products for sale, and retailers have education requirements for explaining recycling options to their customers. Facilities that perform recycling must maintain certification through an internationally accredited third party. DEP must evaluate submissions from manufacturers, maintain the list of registrants, organize public education and outreach, and submit an annual report to the General Assembly. DEP is tasked by the statute to "encourage" the use of existing infrastructure so that covered device recycling is available to at least 85% of the population. However, even ensuring 85% of the population has access to recycling would leave approximately 1.8 million residents without an option to recycle or dispose of their covered devices. Like the landfill ban, the recycling requirement should be statewide.

Implementation

Manufacturers implement their recycling plans in various ways. Many contract with retailers, such as Staples, to allow consumers to recycle old electronics when they shop. Others have arrangements with commercial recyclers, municipal facilities or organizations like the Salvation Army to serve as collection points for electronic waste. Some commercial recyclers

⁷ The electronic devices covered by the statute are desktop and laptop computers, computer monitors and peripherals, televisions, and any components of those devices. 35 P.S. § 6031.102.

offer curbside pickup. Manufacturers who sell their own products at retail can operate a vertically integrated system.

However, because devices are becoming lighter, the system of weight-based goals is failing. During years when manufacturers completely satisfied their collection weight obligations, the total number of covered devices collected declined over time. For example, in 2014, manufacturers collected and recycled 86% of the weight sold in 2012, equaling 62.5 million pounds. In 2015, manufacturers recycled 100% of the weight sold in 2013, equaling 62.4 million pounds, which was slightly less weight despite the larger percentage. In 2016, collection of 100% equaled 62.7 million pounds, and in 2017, collection of 100% dropped to 58.1 million pounds. With the weight-based goals declining, it is unclear when or how the older waste electronics, particularly CRT televisions, will ever be recycled.

Not to be overlooked is the residents' contribution to the recycling effort. Residents are responsible for transporting covered devices from their homes to an appropriate collection site at their own cost. The distance between home and a collection site can sometimes be considerable, and many older televisions are very heavy and cumbersome to move. There may or may not be a charge for recycling at the site, as many sites not supported by manufacturers have found it necessary to charge a fee.

Local governments often host sites used by manufacturers for collecting covered devices. These sites must be staffed and provide for transportation to a recycling entity. Often the cost to staff these sites, as well as the materials used to arrange for transport and the transportation itself, falls upon local governments.

Policy Alternatives

In order to ensure the Covered Device Recycling Act is providing the greatest benefit to Pennsylvania's residents and the environment, there are several updates that could be made to the statutory requirements. Some possible policy alternatives include requiring covered device recycling management by manufacturers; exploring new funding mechanisms for the implementation of the CDRA; removing the current landfill ban; allowing "retrievable cells" as a disposal method; and providing more enforcement mechanisms to ensure compliance with the CDRA. These alternatives are discussed in more detail below.

Management by Manufacturers

The current system under the CDRA requires manufacturers to provide for collection, transportation and recycling, which is usually accomplished by contracting with others. As a matter of principle, placing the obligation on manufacturers is logical because manufacturers choose the materials that go into their products and are therefore responsible for the environmental consequences. This system has practical benefits as well. Contracting with entities who own existing buildings avoids the need for new construction, and, if they are stores, the buildings are presumably already located in places that are convenient to the public. These entities also have their own transportation infrastructure in place.

However, issues arise in placing the obligation on manufacturers. Some manufacturers do not want to be required to recycle certain types of covered devices that they do not manufacture. Manufacturers also vary widely in how much they produce, so it is unfair to expect small manufacturers to recycle more than large ones. The CDRA currently addresses this with weight-based goals, which are insufficient as noted above. While retail stores are often located in places convenient to consumers, they are not always in places with low population density, like rural areas, as there is less incentive to locate there.

The continued management of collection and recycling of covered devices by manufacturers can continue, but with updated conditions. DEP suggests the removal of weight-based goals and replacement of those requirements with a convenience-based system in which all residents have reasonable access to recycle all covered devices. This is critical to combating illegal dumping and ensuring proper recycling of covered devices. Collection sites also should not stop collecting electronic waste just because a manufacturer's quota has been met. This again requires decoupling the obligation to provide for recycling derived from weight-based goals. Sites should be accessible to every resident, have hours that are convenient, and accept all covered devices.

Some states allocate responsibility among manufacturers by a "return share." In this system, when residents take waste electronics to a collection site and the electronics are recycled, the recycling facility invoices the manufacturer of each device by brand. This inverts the financial obligation from production-focused to recycling-focused. The lack of a hard target means residents can continue to bring waste electronics to collection sites without those sites closing down because the manufacturers' targets are met. DEP could support a move to this "return share" system depending on the specifics of what this would entail.

Other states allocate responsibility based on market share without a hard target for collection. DEP could support a market share system if it ensured that recycling will continue at no cost to the consumer and with adequate convenience for the public.

Management by State and Local Government

Under the CDRA, DEP is primarily tasked with the approval of plans and enforcement of violations. DEP is not involved in contracting for collection and recycling. Some local governments have established their own collection sites, and they either manage the facilities themselves or contract for those services. The position of local governments is different from DEP's, because local governments already have an obligation under Act 101 to provide for collection of traditional recyclables so they are already engaged in this type of contracting.

Various proposals have been made to increase DEP's role, including the development of a statewide plan for recycling waste electronics and the suggestion to contract for services statewide. Others have proposed to increase the roles of counties and municipalities, such as requiring drop-off convenience centers to be established in each county that would be managed or overseen by county governments.

DEP does not believe its proper role in recycling involves entering into and overseeing a multitude of contracts. While there is logic in managing these contracts from a central position,

this would involve the coordination of 67 counties and thousands of local governments. Engaging in contracting statewide would require a significant increase in DEP staff and a transformation of DEP's role and workload.

DEP could support management of collection sites and recycling contracts by local governments. Management of collection sites by local governments has several benefits: they are already engaged in contracting for recycling services; fairness among government entities is not an issue in the same manner as between large and small companies; collection sites can be located in places, like rural areas, that might be unprofitable for a business to operate; and there is already existing infrastructure in approximately one-third of Pennsylvania counties.

Funding Mechanism

Manufacturers currently pay a registration fee that supports DEP's implementation of the CDRA and are prohibited from charging a fee to consumers when they return material for recycling. The cost of compliance is internalized by the manufacturers in the retail price, and many additional costs are passed along to the consumer and the taxpayer via charges to local governments or through additional fees. Allowing manufacturers to charge a fee to recoup their costs has also been suggested. However, as stated, costs are already internalized, which would lead to an additional financial burden on the consumer. It has also been suggested to authorize a tax levied by the state or county governments to pay for the establishment of new collection sites. To do so would represent a radical shift of the financial responsibility of recycling from manufacturers to taxpayers.

Opinions on these proposals vary within the industry. Many manufacturers prefer the ability to charge a fee on consumers to recoup the cost of contracting for services. On the other hand, many retailers do not support fees because they negatively impact sales in competition with online and out-of-state options.

Imposing a fee on consumers represents a major shift in policy and has many drawbacks, including those mentioned above. Manufacturers determine the materials that go into their products and create the environmental problem in question, so they should be responsible for the products' consequences instead of consumers. Because fees are charged by other states and sales of electronics are nationwide, manufacturers have already built those fees into the nationwide price of each product. It would be inappropriate to demand that the Commonwealth's consumers pay a separate fee on top of the cost-internalized amount already paid. The current model is Pennsylvania's first extended producer responsibility (EPR) model. Transferring the financial responsibility from the manufacturer to the consumer or resident could set a negative precedent inhibiting the passing of future EPR models. As CRT televisions continue to phase out of the recycling stream, any burden to the manufacturers regarding the cost of their recycling should be assuaged.

Removal of Landfill Ban

Removing the ban on landfill disposal of covered devices has also been proposed. The purpose of removing the ban would be to facilitate the cleanup of illegally dumped electronics that are creating neighborhood nuisances and health hazards throughout the Commonwealth. Given

that CRT televisions are no longer manufactured on a large scale, lifting the ban even temporarily might allow for a concerted cleanup of the old CRTs with fewer dumped illegally in the future.

Removing the ban is not recommended for two reasons. First, municipal waste landfills are not the proper place for disposal of large quantities of concentrated CRT televisions as leaded glass accumulated speculatively is classified as hazardous waste. A concerted cleanup effort in a short period of time might create “hot spots” in landfills in which large, concentrated amounts of leaded glass that have been collected or stockpiled are disposed of, posing problems in the near and distant future. CRT glass that is accumulated speculatively would need to be treated to meet the land disposal restrictions of hazardous waste regulations prior to placement in a hazardous waste landfill.

Second, removing the “backlog” of CRT televisions would not alleviate the problem of electronic waste in the long term. Newer flat-screen monitors contain mercury, which is also hazardous, and are now old enough that they are also being dumped. Other states that recycle the most electronic waste per capita have landfill bans in place.⁸ What the Commonwealth needs is a reliable system for collection at times and places that are convenient for consumers to use. Research has shown that when accessible recycling options are available, illegal dumping decreases.⁹

Retrievable Cells

In lieu of removing the landfill ban, it has also been suggested to modify the ban to allow electronics to be disposed of in “retrievable cells.” This would be an isolated cell in a hazardous waste landfill that would keep CRT glass separate from other materials and could be retrieved at a later time for recycling.

While this process currently exists, the likelihood of the glass ever being retrieved is minimal and not realistic due to cost, worker safety issues, and the increased importance of keeping lead out of the environment after recent events in Flint (MI) and Pittsburgh (PA). Due to these concerns, the Department does not support this concept. These cells could result in environmental concerns if they fail and suddenly turn into “hot spots” of hazardous materials. This also does not fit the definition of “recycling” in Act 101.

Enforcement Authority

Enforcement of the CDRA can be difficult at times because of the ambiguous nature of the statute related to both penalties and manufacturer obligations. Section 507(b) (describing penalties), for instance, lacks specifics on how to assess penalties based on the severity of the infraction or the length of non-compliance. Another potential feature employed by other states with similar electronic waste laws would be a Commonwealth-wide sales ban on covered devices

⁸ Electronics TakeBack Coalition. “How much e-waste is collected in states with recycling laws?” Available at http://www.electronicstakeback.com/wp-content/uploads/Facts_and_Figures_on_EWaste_and_Recycling.pdf.

⁹ Nestor Resources, June 2014. *Illegal Dumping in Pennsylvania: A Decade of Discovery*, p. 16. Available at <http://www.keeppabeautiful.org/wp-content/uploads/2016/09/KPB-Recommendations-August-2014.pdf>. This concept pertains to all types of materials and not just electronics.

sold by any manufacturers found to be out of compliance. Shown to be one of the most effective methods of assuring manufacturer compliance in other states, the inclusion of specific language regarding a sales ban would greatly benefit the program.

As new types of electronic devices are created, manufactured, and sold, the definition of what is and what isn't a covered device should be flexible in response. New electronic devices containing potentially harmful materials could impact the health and safety of residents of the Commonwealth and therefore require the Department's attention to ensure they are properly recycled. Expanding the definition of covered device could providing DEP with the ability to add new covered devices to the definition as they appear in the marketplace and would make the program more agile and able to respond to future changes in the electronic device manufacturing landscape.

Solutions

Based on the information described above, the Department recommends that the Covered Device Recycling Act should be amended to include the following elements:

- Metrics should shift from weight-based goals to a convenience system that uses a return or convenience share. This will ensure that residents have access to free recycling and that all materials can be collected and recycled.
- Permanent collection sites should be established in every county with a minimum operating schedule. This will ensure availability for drop-offs is consistent and convenient to the public. Permanent, on-going collection sites should reduce costs in the long term as compared to special one-day events. The entire commonwealth should be covered, not just the 85% currently covered by CDRA recycling programs.
- Collection sites should be required to take every type of electronic device covered by the statute. The statutes should also clarify that no charge for collection, transportation or recycling can be assessed or passed on to local governments or residents by recyclers, manufacturers and retailers.
- The ban on landfill disposal of electronics should continue.
- The concept of "retrievable cells" should not be allowed because of the potential for negative environmental impacts and the conflict with the definition of "recycling" in Act 101.
- Recycling collection, transportation and processing should be managed by manufacturers or by local governments, not by DEP.
 - ✧ If recycling is managed by manufacturers, the obligation to collect should not be a hard target based on weight, because changes in technology have made new products lighter than the old products that remain uncollected. A "return share" system as described above or a market share system that does not include a hard target should be added to any

manufacturer program. A manufacturer must be responsible for the recycling of every type of covered device collected, regardless of whether it manufactured the device.

- ✧ If collection is performed by local governments, then manufacturers should be required to contribute funding for collection, transportation, and recycling. This could be determined by “return share” or market share as described above.
- ✧ DEP should not be required to engage in statewide contracting, which would require a significant increase in staff and a transformation of its current role.
- Funding for collection, transportation and recycling should not come from a tax or fee on consumers or local governments.
- Enforcement authority could be improved by creating more explicit standards for compliance and implementing penalties for non-compliant actors. The option to implement a sales ban on non-compliant manufacturers should also be considered as an avenue to increase program compliance.