

# Embracing a Circular Economy: Modernizing the Covered Device Recycling Act

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## Abstract

End-of-life electronics are the fastest growing type of solid waste on the planet, and present a myriad of unique challenges, including unpredictable changes to form, data liability, severe environmental and human health hazards, and difficulty in delivering access to rural communities. Pennsylvania's Covered Device Recycling Act attempted to solve these problems, but currently leaves the costs of electronics disposal on the shoulders of residents, townships, municipalities, school systems, and businesses. However, there are sustainable market solutions to the problems posed by electronics waste, and models in other states have successfully addressed these issues. Pennsylvania has an opportunity to replace its nonfunctional e-waste recycling program with one that delivers solutions for all residents without the need for financial support from the state.



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## Executive Summary

In 2010, the Covered Device Recycling Act (“CDRA”) was signed into law, and while this act was an important step in addressing the growing challenge of e-waste, as it stands over a decade later, the CDRA does not meet the needs of consumers, municipalities, schools, and businesses. There is no secure or responsible way for almost all of the Commonwealth to dispose of electronics free of charge, and costs arising from proliferating technology will only increase over time Pennsylvania.

There are at least 6,000 known illegal dump sites in the state, with most located in rural counties.<sup>1 2</sup> Approximately 59 million pounds of covered devices were recycled responsibly in 2020, while only 23.7 percent of Pennsylvanians have unrestricted access to electronics recycling according to the DEP.<sup>3</sup> This data indicates there are likely hundreds of millions of pounds of electronics unaccountably entering the state without a solution for the associated end-of-life costs.

A functional program for electronics recycling driven by market share producer responsibility will prevent and radically reduce the growing damage wrought by data insecurity and lack of recycling access to consumers across Pennsylvania.

## Proposal

E-waste is neither a localized nor a novel problem. Pennsylvania should follow the example of states who have already developed efficient market solutions by updating the CDRA to meet the needs of today. Other state programs leverage the forces of supply and demand through a market share model, which stimulates a burgeoning electronics recycling industry, reduces or eliminates costs for local governments and taxpayers, and enables unrestricted recycling services for rural communities.

A “Market Share” Electronics Producer Responsibility, or Extended Producer Model (“EPR”) model would remove the weight-based manufacturer responsibilities of the CDRA and replace them with a simple calculation of market share by electronics category. With minimal administration and negligible additional cost to manufacturers, a market share model creates a viable marketplace for disposal obligations.

The DEP would annually determine the average costs of electronics disposal based on readily available industry data, setting a market rate-based non-compliance fee for the year. Manufacturer plans are filed annually, and comparing these plans with monthly authorized recycler reports empowers the DEP to easily identify and administer penalties for noncompliant producers. Producers negotiate with local authorized recyclers directly to responsibly handle collection and recycling obligations for the plan year, paying recyclers market rates to offset their share of electronics sold, stimulating local job creation, and creating a landscape for municipalities to arrange zero-cost or net-positive consumer disposal programs with recyclers. DEP administrative costs are offset by authorized recycler and manufacturer fees for program participation. Elements for a successful expansion of the CDRA include:



1. **Implement a market share EPR model.** According to the DEP, current manufacturer obligations based on historic weights fail to offset the costs of new devices sold.<sup>3</sup> As intended in the original drafting of the CDRA, a model based on market share will shift end-of-life device costs away from residents and municipalities, and towards those producing the waste stream.
2. **Expand device definitions to capture ever-changing forms of technology.** The CDRA defined electronics covered under the program in untenably narrow terms. The insufficient scope in defining 'covered devices' led to the exclusion of most forms of electronics used today. An ideal system will maximize inclusion of current hardware, as well as foreseeable devices in the future.
3. **Expand definitions for entities included under the program.** The CDRA heavily restricted which members of the community can recycle devices under the program. The constraints imposed on the program by limiting counted electronics to only residents, or organizations with fewer than fifty people, prevents the viability of widespread recycling models in rural communities. Expand the covered entities to include at least a person, State entity, school district, local government unit or small or medium businesses with fewer than 500 employees who purchases a covered electronic device in a transaction that is a retail sale.
4. **Utilize proven industry accreditation and fee structures for stakeholder compliance.** Third-party audited certification standards within the recycling industry empower the DEP to oversee this program without need of additional resources. Additionally, program participation fees for authorized recyclers and manufacturers can offset DEP administrative costs and prevent bad actors from entering the state. Examples of comprehensive third party audited certification standards are: SERI's "R2v3" standard and the "e-Stewards Certification".

Using a market share system ensures producer obligations directly match waste stream contribution. The toll of improper disposal is already borne by Pennsylvania taxpayers as-is, and a market share system leverages the preexisting electronics recycling industry, saving manufacturers and retailers from reinventing the wheel to provide recycling services outside of their core business models. Recycling costs are already built into most Producers business models. The Commonwealth could support widespread participation by exacting a reasonable per pound noncompliance fee based on available industry data, such as those posted by the Electronics Recycling Coordination Clearinghouse (ERCC) on Producers not recycling in line with their market share. For example, a 1.5 multiplier of the proposed annual market rate.

## Recommendation

As it stands, the CDRA does not enable a functional recycling marketplace for electronics in Pennsylvania in today's world. We recommend significant expansions to the definitions of electronics categories and entities covered under the program, making manufacturer obligations based on market share rather than device weight, and incorporating plan and fee structures for participating manufacturers and authorized recyclers in-order to create a self-sustained market for e-waste recycling. This market share landscape will convert mountains of waste in our state into commodity streams, empowering local governments, taxpayers, schools, and businesses to recycle with minimal or eliminated costs.



## Introduction

### The Blight of Electronics Waste

Electronics recycling is a crisis in the Commonwealth, and it will only grow in significance for the foreseeable future. Unpredictable proliferation of the scale and scope of electronics, ever-evolving form factors and materials, and data insecurity present unique challenges for the creation of enduring e-waste programs. The costs of improper disposal are numerous, difficult to track, and are primarily forced upon the taxpayers of rural communities. While the Covered Device Recycling Act attempted to wisely address the issue using an EPR model, unfortunately the program was too limited to stimulate a functional electronics recycling marketplace.

### The Fastest Growing Form of Waste

In 2023, all Pennsylvanians are impacted by the integration of electronics into our society. Modern devices provide incredible opportunities for improvement and expanded accessibility to healthcare, communications, education, and much more, but there are insidious costs to these omnipresent electronics, and we are all facing what the United Nations has called a “tsunami of e-waste” in the coming decades.<sup>4</sup>

The E-waste resulting from these devices is the fastest growing form of waste on the planet according to UN data.<sup>5</sup> Electronics waste generated in the year 2030 is projected to double the e-waste produced in 2014, and despite this staggering rate of increase, only around 15% of electronics are recycled in the United States each year.<sup>6</sup>

In 2020 the Pennsylvania DEP identified approximately 59 million pounds of responsibly recycled “Covered Devices” from “Consumers,” as defined by the CDRA.<sup>3</sup> However, the impact of these collections is difficult to measure, as current definitions for “Covered Devices” and “Consumers” exclude most devices in the state, and no one knows exactly how much e-waste is entering Pennsylvania. Given that only 23.7 percent of the population has unrestricted access to electronics recycling, it is reasonable to estimate there are hundreds of millions of pounds of unaccounted electronics in the state.<sup>3</sup>

With accountability focused only on the point of recycling, and for only a narrow band of specifically covered devices, it is very difficult to estimate how many total electronics are being produced and sold into Pennsylvania each year. Difficulty in establishing quantities of devices produced is a consistent challenge for tracking e-waste according to the World Economic Forum, but this problem can be overcome by adopting a market-share EPR model, utilizing device producer reporting to establish quantities of devices sold into the state each year, as further detailed on Page 12.<sup>7</sup>

A key feature of technology is constant change, and unlike most forms of waste, the costs associated with device disposal are not necessarily correlated with size, composition, or complexity. While devices keep shrinking, their utilization has spread into every corner of households, businesses, schools, and government offices. From smartphones in every pocket to internet-connected cameras on highways, the form of e-waste varies to an incredible degree, and the associated challenges of reuse or recycling can be monumental, as a single product could contain more than 1,000 different substances, with materials choices changing continuously.<sup>8</sup> Additionally, data security is a somewhat unique concern for the waste stream,

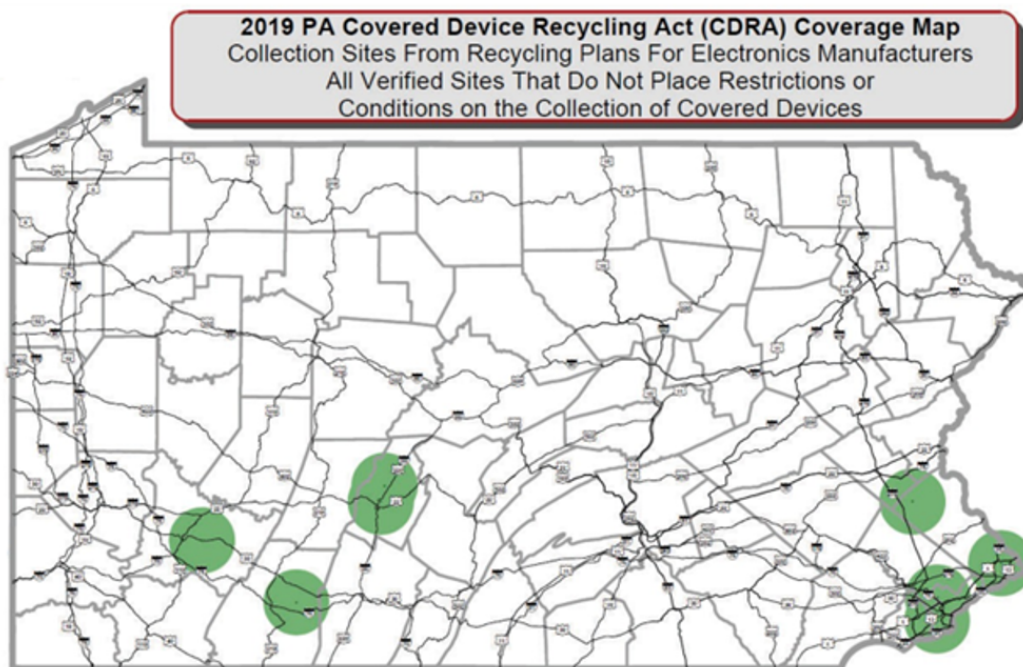


as a chip the size of a fingernail could contain limitless liability to an organization. While a mountain of waste may pose no threat at all, one 'needle' in the electronics 'haystack' could result in billions of dollars in damages, as proven by data breaches such as the 2020 SolarWinds incident.<sup>9</sup>

### End-of-Life Costs are Foisted onto Rural Communities & Taxpayers

According to the 2014 *Analysis of Illegal Dumping in Pennsylvania* by the non-profit organization Keep Pennsylvania Beautiful, most illegal dumping in Pennsylvania occurs in rural counties.<sup>1</sup> This report concluded that the conditions and access to recycling in a region are predictors for illegal dumping, and regions without access to responsible disposal often have lower threats of detection and punishment, resulting in the formation and proliferation of active illegal dump sites.<sup>1</sup>

Figure 1: Where is taxpayer access to e-waste recycling in Pennsylvania?



Source: PA Department of Environmental Protection Report to the General Assembly, 2020



Figure 2: Where are illegal dump sites concentrated?

County	Year of Survey	Total Sites Identified	Active Sites (At time of Survey)	County	Year of Survey	Total Sites Identified	Active Sites (At time of Survey)
Adams	2009	116	86	Lackawanna	2009	92	76
Allegheny	2005	485	300	Lancaster	2009	16	13
Armstrong	2009	176	125	Lawrence	2008	31	30
Beaver	2010	120	107	Lebanon	2010	43	32
Bedford	2008	128	102	Lehigh	2013	16	15
Berks	2008	100	91	Luzerne	2007	159	100
Blair	2010	116	90	Lycoming	2011	50	41
Bradford	2012	74	48	McKean	2008	73	60
Bucks	2011	123	74	Mercer	2005	143	33
Butler	2007	217	215	Mifflin	2010	31	17
Cambria	2010	203	171	Monroe	2011	61	50
Cameron	2010	6	4	Montgomery	2009	19	18
Carbon	2012	49	48	Montour	2012	7	6
Centre	2009	56	40	Northampton	2013	51	45
Chester	2012	33	31	Northumberland	2006	125	95
Clarion	2009	102	78	Perry	2009	105	53
Clearfield	2010	112	90	Philadelphia	2012	296	287
Clinton	2010	50	31	Pike	2013	15	14
Columbia	2007	39	36	Potter	2011	56	46
Crawford	2008	82	38	Schuylkill	2008	74	69
Cumberland	2005	37	27	Snyder	2009	45	43
Dauphin	2006	138	109	Somerset	2008	210	128
Delaware	2012	26	26	Sullivan	2011	6	4
Elk	2007	79	53	Susquehanna	2013	104	68
Erie	2005	83	48	Tioga	2011	86	66
Fayette	2005	163	99	Union	2010	21	16
Forest	2009	15	14	Venango	2008	174	157
Franklin	2009	128	118	Warren	2009	59	47
Fulton	2008	19	17	Washington	2005	126	54
Greene	2007	49	32	Wayne	2013	43	24
Huntingdon	2010	202	160	Westmoreland	2009	310	260
Indiana	2007	114	72	Wyoming	2013	14	11
Jefferson	2007	67	38	York	2010	274	249
Juniata	2010	49	34				

Source: Keep PA Beautiful Analysis of Illegal Dumping in Pennsylvania, 2014

Taxpayers without recycling access, and facing substantial out-of-pocket costs for proper disposal, often dump electronics illegally. These financial costs then fall onto counties, municipalities, and townships, and ultimately businesses, school systems, and taxpayers through deferred disposal costs, falling onto townships after years of environmental damage.

Toxic chemicals such as lead, mercury, and other heavy metals are leaching into the soil and underground water table while these mountains of electronics wait for years or decades. E-waste is only an estimated 2% of solid waste streams, but electronics introduce 70% of the hazardous materials found in landfills.<sup>10 11</sup> If never collected for proper disposal, fires reaching landfilled devices release toxins into the atmosphere, and microplastics, invisible to the naked eye, spread into our waterways, soil, and even the cells of our body.<sup>12</sup>

Pennsylvanians are consuming the average equivalent of one credit card of plastic every week, and while illegal dumping is concentrated in rural communities, the environmental costs gradually spread, as illustrated by a recent study by the PennEnvironment Research & Policy Center which found microplastics in 100% of waterways tested across all of Pennsylvania.<sup>12 13</sup>





## The Covered Device Recycling Act

In response to the growing problem of electronics refuse, Pennsylvania Governor Ed Rendell signed the Covered Device Recycling Act in November of 2010. Prior to the CDRA, the Municipal Waste Planning, Recycling, and Waste Reduction Act of 1988 controlled mandatory recycling for certain solid waste streams of materials in municipalities greater than 5,000 residents, but until the CDRA, no recycling legislation in Pennsylvania addressed disposal of computer equipment, monitors, or televisions explicitly.

Sponsored by Rep. Chris Ross, the CDRA requires manufacturers of Covered Devices sold in Pennsylvania to establish a program for the collection, transportation, and recycling of these devices, and imposes duties on certain manufacturers and retailers for specific categories of electronics sold in the state ("Covered Devices"), while making landfilling electronics prohibited.<sup>14</sup>

The Act narrowly defines 'Covered Devices' as computer devices, television devices, computer monitors, or peripherals which are marketed and intended for use by consumers specifically, which also includes e-readers if they have internet connectivity and a web browser.<sup>14</sup> Covered Devices under this definition do not include computer and television devices intended for use by companies or schools, networking equipment, appliances, telephones, GPS and personal handheld devices, and a myriad of other forms factors. Acceptable devices for recycling under the CDRA are further limited by only allowing electronics from "Consumers:" individuals or small businesses with 50 or fewer people.<sup>14</sup>

Manufacturers of Covered Devices must register with the DEP, collect, and recycle a weight of Covered Devices equal to or greater than their past two-year prior sales of Covered Devices in the state, and submit an annual report that details their recycling efforts.<sup>14</sup> The DEP in-turn must provide an annual report to the General Assembly that outlines weights of Covered Devices recovered, a summary of registered manufacturer recycling contributions, and evaluations of the current project infrastructure, outreach, and recommended changes.<sup>14</sup> Duties and powers necessary to administer the program are provided to the Department of Environmental Protection under the CDRA, and the Act establishes an Electronics Material Recycling Account in the General Fund, as well as penalties for noncompliance.<sup>14</sup>

Unfortunately, the CDRA failed to establish a sustainable program for responsible electronics recycling in Pennsylvania, and the duties imposed by the Act had the unforeseen consequences of destroying previously viable municipal operations which provided residents with unrestricted access to e-waste recycling services.<sup>15</sup> Ten years after the passage of the CDRA, approximately 76 percent of Pennsylvanians are without unrestricted access to electronics recycling opportunities according to the DEP.<sup>3</sup>



E-waste is a long-recognized challenge in many Pennsylvania communities, and multiple attempts to revise or overhaul the CDRA have been attempted over the years, as detailed in Figure 3 below:

Figure 3: Previous Attempts to Update the CDRA

Sponsored Bill	Leg. Session	Sponsor	Notes
House Bill 1900	15-16	Ross	"...would create an opportunity for private contractors to bid on collecting, transporting and recycling the amount of electronic waste in each county that is not currently being accounted for by the existing system. The cost would be apportioned to the manufacturers on the same market share basis currently being used in the existing law. As in the existing law, manufacturers would be able to bid to take care of their obligations."
House Bill 196	15-16	Miller	"Under this legislation, the pound-for-pound method established under Act 108 would be amended to provide that for each pound of new covered devices sold during the previous program year, manufacturers would be required to recycle two pounds of covered devices."
House Bill 2089	15-16	Bloom	"...introduce legislation to authorize the Department of Environmental Protection to waive the provisions of Act 108 for municipalities located greater than five (5) miles from a DEP-permitted electronic recycling facility."
House Bill 2309	15-16	Flynn	"...would amend Act 108 to require that manufacturers recycle a quantity of covered devices on a graduated scale as follows: - Calendar years 2017-2018, a quantity equal to three times the manufacturer's market share. - Calendar years 2019-2020, a quantity equal to two times the manufacturer's market share. - Calendar year 2021 and every year thereafter, a quantity equal to the manufacturer's market share."
House Bill 1279	17-18	Flynn	Reintroduces HB 2309 (2015-2016)
House Bill 1736	17-18	Quinn	Reintroduces HB 1900 (2015-2016)
Senate Bill 975	17-18	Gordner	Models an update to the CDRA on the NY system, requiring manufacturers to offset all devices they produce, as well as excess/orphan devices. Mandates 1 collection site per county, and for every municipality > 25k residents
House Bill 75	19-20	Rothman	Reintroduces HB 2089 (2015-2016)
House Bill 179	19-20	Quinn	Reintroduces HB 1736 (2017-2018)
House Bill 575	19-20	Flynn	"...to amend the Covered Device Recycling Act to require manufacturers to recycle a quantity of covered devices on a graduated scale, ensuring that more electronic items are recycled."
House Bill 2197	19-20	Dush	Adding Solar Panels to CDRA
Senate Bill 52	19-20	Gordner	Reintroduces SB 975 (2017-2018)
House Bill 266	21-22	James	Adding Solar Panels to CDRA
House Bill 1243	21-22	Quinn	Reintroduces HB 179 (2019-2020)
Senate Bill 415	21-22	Gordner	Reintroduces SB 52 (2019-2020)
Senate Bill 530	21-22	Dush	Adding Solar Panels to CDRA

Source: Pennsylvania General Assembly, Legislation Amending Act 108 of 2010

The economic and environmental consequences resulting from lack of access to responsible recycling cannot be overstated. Swift action is needed in Pennsylvania to mitigate damage already incurred, and to prevent future harm from this unseen threat seeping into our soil and waterways. The costs of inaction are too much to bear, and without meaningful revisions to the CDRA, those costs will crash down upon the shoulders of our towns, school systems, small to medium-sized businesses, and taxpayers directly.

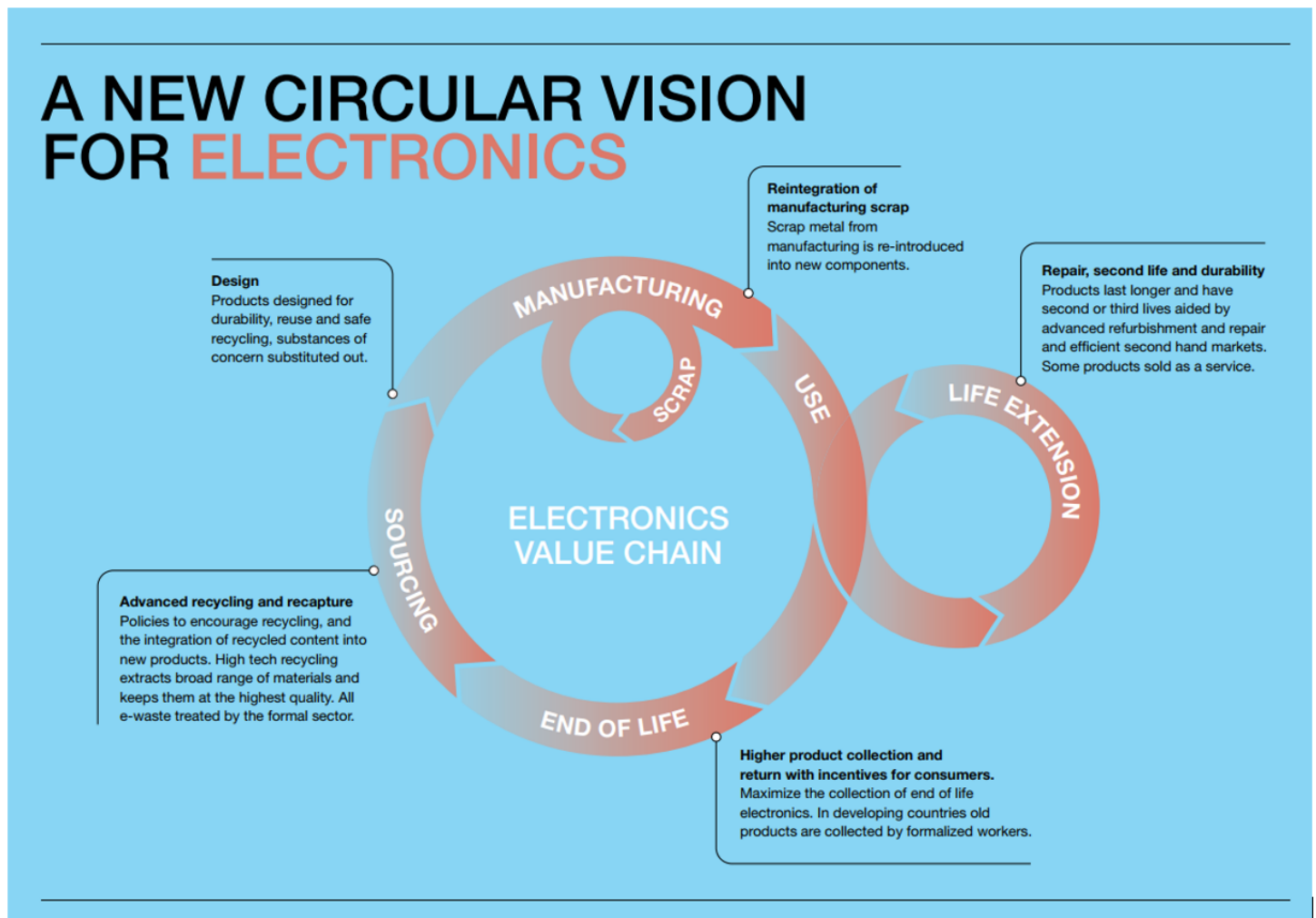


## Background

### There are Sustainable Market Solutions to the Problem

In its 2019 Report on solutions to the growing e-waste epidemic, the World Economic Forum recommended market-based solutions focused on extended life, followed by closed-loop recycling, and incentivized by legislated EPR programs, as highlighted in Figure 4 below:<sup>7</sup>

Figure 4: How to Convert E-waste into Market Commodities:



Source: World Economic Forum, A New Circular Vision for Electronics, 2019



## Electronics Producer Responsibility E-waste Recycling Models

EPR models operate by shifting burdens of electronics collection and disposal from taxpayers to the producers of the waste stream. Multiple models exist to facilitate this reallocation of end-of-life disposal costs, as well as hybrid programs borrowing elements from each.

- A Market Share EPR program allocates manufacturer recycling obligations directly in proportion to the manufacturer's market share or sales volume.
  - This model incentivizes collaboration between manufacturers and authorized recyclers. Authorized recyclers handle electronics collection and recycling on behalf of manufacturers to satisfy plan obligations.
  - Rather than a central Clearinghouse model, a Market Share model only requires manufacturers to take responsibility for the share of electronics they sold in the state, so obligations are tied directly to sales. Categories of electronics can be established to ensure compliance without overly burdensome reporting requirements.
  - By using the burgeoning electronics recycling industry, Market Share solutions avoid the need for manufacturers and retailers to establish their own collection and recycling logistics and procedures, enabling them to focus on their core business models.
  - The DEP can easily set annual rates for average electronics disposal costs in a transparent process based on readily available industry data. Producer responsibilities are calculated based on simple reporting of devices sold, and they contract with authorized recyclers to handle the collection and recycling of electronics equal to their obligations. Authorized recyclers file regular reports to the DEP detailing fulfilled plan obligations through devices responsibly recycled, and the DEP can administer fines at some level above the market rate for any noncompliant producers.
  - Examples include: New Jersey, New York
- In a Clearinghouse EPR program, the collection and recycling of electronics is managed by centralized third parties, such as county governments, or retail operations.
  - Manufacturers typically pay fees into a Clearinghouse system for administrative costs, while the centralized administrators, such as county governments, can develop their own recycling facilities, or agreements with other recyclers.
  - Rather than a Market Share model, Clearinghouse programs do not necessarily tie manufacturer responsibility to waste stream contributions. This can generate an unlevel playing field of winners and losers, with consumers often bearing the brunt of shortfalls. Reporting is simple and efficient, as there are no specific categories of electronics to track.
  - While a Clearinghouse model can potentially leverage aspects of the electronics recycling industry to offset costs, these programs insert a separation between recyclers and producers, potentially creating inefficiencies and often requiring



non-recycling entities such as retailers and government agencies to offer services well outside of their core expertise.

- A Clearinghouse model potentially provides distributed access to consumers, as often retailers or townships will introduce electronics collection services. However, this typically does not enable services for school systems, small and medium sized businesses, or government agencies. Given the centralized management of a Clearinghouse program, they do not truly generate a 'market value' for the waste stream. This does not incentivize efficient extended life electronics recycling, and often leaves pockets of organizations in the state without a no-cost solution for disposal.
- Examples include: Virginia, Maryland
- An Individual Producer Responsibility model mandates that each waste stream producer must directly manage the collection and recycling of their own products.
  - Manufacturers must develop and implement programs for end-of-life product disposal, which is often orchestrated through fees or deposits to incentivize consumers while punishing noncompliance.
  - An Individual Producer Responsibility model requires that manufacturers deal with only the exact products they produced and nothing more. Reporting requirements are likely detailed and regular to ensure stakeholder compliance.
  - Requiring producers to engage with collection and recycling services which may be completely outside of their core expertise may be inefficient. Additionally, incentives needed for a successful collection program may necessitate somewhat predatory fee or deposit mechanisms for consumers.
  - There is no market value generated within an Individual Producer Responsibility model, as it is a vertically integrated component of a producer's business by mandate.
  - Examples include: Texas
- In addition to the Market Share, Clearinghouse, and Individual Producer Responsibility models, there are a variety of hybrid models incorporating features from each of the systems.
  - Some electronics disposal programs also introduce recycling fees at the point of sale, requiring consumers to pay when purchasing a new product. These fees are centralized within an administrating agency and used to offset disposal costs as part of a larger collection and recycling program.



## Manufacturer/Producer Perspectives of Successful E-waste Management Programs

In *An Exploratory Study on Producer's Perspective towards E-Waste Management: A Case of Emerging Markets*, authors Dr. Thukral and Dr. Singh performed a series of interviews with representatives of electronics manufacturers from all levels of responsibility.<sup>16</sup> A content analysis of the interviews was performed to categorize manufacturer responses to EPR programs, which were divided into one of two categories: "Barriers," detailing challenges to a successful e-waste program from producer viewpoints, and "Enablers/Facilitators," the incentivizing mechanisms within an EPR system based on producer experience.<sup>16</sup>

From the perspective of electronics manufacturers, the most common "Barriers" to a successful EPR program are:<sup>16</sup>

- Lack of awareness
  - The variety and regional dependence of rules for responsible handling of e-waste reduce clarity for manufacturers, as well as recyclers and individuals. There is often a lack of awareness of what role or responsibility producers are expected to own within convoluted or ineffective EPR programs, and unawareness of government requirements for correct disposal leads to inadvertent noncompliance.<sup>16</sup>
- Lack of infrastructure
  - Producers see the lack of transportation, authorized recycler service regions/limitations, scarce collection centers, and the inability of recyclers to recapture value as some of the biggest challenges to an EPR system.<sup>16</sup>
    - Lack of transportation refers to the challenges involved with individual packaging/mailling/delivering electronics from households to recyclers – the variety of forms of electronics, unique shipping materials needed, infrastructure required to receive individual shipments, and more make the transport of electronics extremely demanding.<sup>16</sup>
    - Related to this challenge of transportation, producers note that the difficulty and costs required in securing and transporting electronics has resulted in a landscape of many small, authorized recyclers, often only serving one or two cities, but very few large, settled partners which can handle the entire scope of an EPR program.<sup>16</sup>
      - As a result of this fragmented landscape, there are often large regions with producer obligations, but no centralized collection points available, resulting in either a lack of compliance or major producer investment to address the hardest regions to service.<sup>16</sup>
      - According to one of the producers interviewed in the study "70%-75% of recyclers are not even aware about the items to be disposed." The burgeoning electronics recycling industry has grown significantly more sophisticated in the past decade, but historically refurbishment and reuse-based value recapture was a minor focus of electronics



recycling. Traditionally, the shredding of all materials received for component metal salvage was the primary model for recyclers, which destroys almost all salvageable value, and increases end-of-life burdens for producers.<sup>16</sup>

- Attitude

- The Study found three common types of attitudes among producers which introduce challenges to EPR success: lack of responsibility, ignorance, and a perception of added burden.<sup>16</sup>
  - “Lack of responsibility” refers to the view that producers may look at e-waste management programs as merely a regulatory hurdle, a “box to check” in the pursuit of selling products, rather than owning the responsibility of the waste stream which they produce.<sup>16</sup>
  - “Ignorance” in this Study details the sentiment that producers often don’t care whether the e-waste was ultimately handled responsibly by an authorized recycler or mismanaged by an irresponsible actor – if the regulatory plan is satisfied, any concern often ends for the manufacturer.<sup>16</sup>
  - “Added Burden” or “responsibility” refers to the notion that producers view their obligations toward end-of-life costs as something ‘additional’ or ‘separate’ from the business of creating electronics. Plan creation and compliance, or regulatory record-keeping are sometimes viewed as political burdens rather than a necessary part of the industry.<sup>16</sup>

- Prominence of an informal e-waste sector

- Producers highlight that the presence of “informal” electronics recyclers, meaning unauthorized/unregulated recyclers and scrap materials traders, undermines the development of a formal EPR program at both consumer and producer levels.<sup>16</sup>
  - For consumers, irresponsible means of electronics recycling are often very convenient, can sometimes generate a small amount of scrap material value, and may be the only method known to consumers in a region with a new or developing e-waste management system.<sup>16</sup>
  - For producers, the interviews in the Study uncovered prevailing cultural challenges to shifting manufacturers from informal systems to formal systems. In an informal landscape, producer obligations are minimal if anything at all, whereas in a formal system, compliance, documentation, accountability, and procedures require new workflows, internal changes, and accountability measures for in-house conformity to any new regulations.<sup>16</sup>

- Authorization process for licensing recyclers



- The processes for verifying and approving authorized recyclers can create obstacles for the creation of an e-waste program.
  - According to producers, overly burdensome and lengthy approval procedures can be too time-consuming and expensive for potential recyclers, which may not provide enough service coverage for manufacturer plan obligations.<sup>16</sup>
  - Conversely, if the verification process for authorizing recyclers is not sufficiently robust, “uneducated” or irresponsible companies may secure approval to participate in the EPR program. These actors can fall short of providing for agreed-upon manufacturer plan obligations, leading to producer noncompliance through no fault of their own, and may prolong irresponsible e-waste habits which existed in the state prior to the formal program.<sup>16</sup>

According to the Study, the primary positive “Enablers” or “Facilitators” to a successful EPR program from the perspective of electronics manufacturers are:<sup>16</sup>

- Educating consumers
  - To avoid challenges introduced by lack of awareness detailed above, manufacturers in the Study expressed the paramount importance of educating consumers about correct methods and points of access when introducing new e-waste management systems.<sup>16</sup>
- Providing collection services for e-waste
  - Like educating consumers, consumers must have relatively convenient access to and knowledge of centralized collection sites, or they may continue using less responsible, but more convenient methods of irresponsible disposal. Consumers must know that collection sites are available, and they must be positioned for convenience.<sup>16</sup>
- Clear laws or rules for compliance and feedback
  - Producers expressed the need for not only clear and transparent obligations to ensure compliance, but also reported the importance of knowing their contributions mattered, by metrics such as carbon reduction, landfilled waste avoided, or any other data which supports the effect of their efforts.<sup>16</sup>
- Sufficient incentives for responsible recycling
  - In addition to educating consumers to ensure awareness of responsible recycling options, some consumers may continue to follow unauthorized methods of disposal in exchange for money provided by smaller scrap metal dealers. Producers interviewed recommend financial incentives for consumers, such as refunds or credits toward new equipment purchases in exchange for responsible disposal.<sup>16</sup>





- Educating internal manufacturer participants
  - Finally, producers emphasize the need to educate not only consumers, but also internal stakeholders and all manufacturer staff, ensuring participants understand the importance of responsible disposal to incentivize compliance across all levels.

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When considering a market share EPR model, electronics producers are typically the sole objecting stakeholders.

Taxpayers, municipalities, and school systems enjoy the ability to responsibly discard electronics without fees, or in some cases in exchange for returned value from authorized recyclers. Retailers prefer a market share model versus a clearinghouse model, as the former model empowers recyclers to manage e-waste streams; clearinghouse programs often force retailers to add costly collection and recycling operations outside of their core retail sales expertise. Electronics recyclers favor EPR programs because they extend service regions and enable previously unviable e-waste cleanup projects. Finally, state actors such as government representatives and environmental protection agencies can rely on the market share EPR model to support rural communities without services, and with much less government oversight, administrative costs, and role reinvention than is required under a clearinghouse system.

The time to address Pennsylvania's dire need for a comprehensive e-waste solution is now, before the problem of illegal dumping becomes insurmountable. We should embrace the lessons learned in other states, nations, and by the producers themselves. Connecting manufacturers to authorized recyclers under a market share EPR model will facilitate the maximum benefit for all of Pennsylvania, with only marginal costs to the producers of the waste stream.

## Proposal

### Updating the CDRA is an Ideal Solution for Pennsylvania

As it stands, the CDRA is an attempt at a Market Share EPR model that did not work. The definitions for Covered Devices and originating entities only covered an extreme minority of electronics sold, leaving most forms of electronics entering the state without solution or account. Binding manufacturer obligations to electronics weights was a mistake, as the shrinking nature of electronics effectively nullified producer responsibilities as they improved manufacturing processes year-over-year, resulting in quickly satisfied plan requirements, shutting down municipal collection facilities and leaving taxpayers, schools, and businesses stranded with no recycling outlet.<sup>15</sup>

Pennsylvania should replace current metrics for producer obligations with those based on Market Share of devices sold, organized by simple categories of electronics for tracking and reporting. By expanding the scope of Covered Devices and entities beyond narrowly defined "Consumers," a more realistic share of electronics sold into the state is included, and by mandating a structure for sufficient manufacturer contributions, costly electronics waste will convert into a commodity stream. This will stimulate the existing electronics recycling industry in the state, enabling townships, municipalities, and counties to reestablish collections,



negotiating zero-cost or net-positive programs with authorized recyclers, even in the most rural areas of the state.

New Jersey's Electronic Waste Management Act ("EWMA") is an excellent example of a market share EPR framework which supports recycling service access to every taxpayer and municipality. Based on lessons learned from EWMA successes and challenges, Pennsylvania could convert electronics waste into a commodity stream with only minor changes to the CDRA, while avoiding known pitfalls.<sup>17</sup>

While the EWMA functions well, there are issues which have risen over the years which Pennsylvania could address proactively, staging the program for success and maximum coverage across the rural sections of our state, which is less of a challenge for New Jersey. Additionally, as the primary owners of EPR burdens, producer objections to potential shortfalls should be incorporated into system planning. Prominent solutions include:

- Include strong incentives for compliance without need for constant amendments.
  - Under the EWMA, the New Jersey DEP sets annual market rates for recycling based on industry data, but penalties for producer noncompliance are a fixed monetary value of \$0.50. This penalty is assessed for 100% of producer obligations in a plan year in response to any unfulfilled volume.<sup>17</sup>
  - Modification of the penalty rate requires amendment of the statute, potentially creating a future situation where the market rate exceeds the \$0.50 per-unit penalty, potentially unmaking the EPR marketplace in a given plan year without rapid amendment.
  - A better solution for noncompliance penalties is a multiplier of the annual market rate set by the DEP – for example, a 1.25 multiplier of the DEP-set market rate. This ensures continually effective program incentives without the need for constant amendment, creating confusion for producers.
- Maximize definitions for Covered Devices and qualifying entities.
  - As illuminated earlier, two of the primary limitations of the CDRA were an extremely narrow scope of accepted types of electronics, and highly restricted definitions for what entities could recycle devices under the program.
  - To increase accountability, provide recycling access to all regions, and to capture a larger portion of the e-waste entering the state, definitions for Covered Devices should be maximally inclusive, covering everything from servers and audio-visual equipment to printers, handheld electronics, and smart watches.
  - Restrictions on the types of entities which can recycle electronics under the program should be similarly lifted, enabling larger single sources of the waste stream, such as municipalities, school systems, medium-sized business, and medical networks, offering them access to zero-cost or net-positive recycling and data security services.



- Define categories of electronics for simple market share reporting and analysis.
  - As of 2018, the EWMA has been amended to categorize all electronics recycled under the program within a few general groupings.<sup>17</sup>
  - Grouping electronics into simple categories helps to ensure manufacturer plan obligations equitably match individual producer wastes generated.
  - Additionally, simple categories for captured e-waste enable the DEP to monitor trends of electronics disposed of within the state, while only adding a bare minimum of extra reporting burden for producers and authorized recyclers.
- Include provisions for recycling education.
  - The inclusion of electronics recycling education is already a component of the CDRA.
  - Within a viable market share EPR program, municipalities are the best vector for educating consumers.
    - Once the e-waste market is unleashed, municipalities will partner with authorized recyclers, and will often be the primary collection points for individual consumer recycling. In their capacity as collection points generating net-positive revenues for e-waste, local governments will be able to advertise electronics recycling services, and sponsor profitable or zero-cost collection events.
- Address the initial transition years of a new EPR landscape.
  - In the first years of a new e-waste management program, there will be a transition period of pent-up demand from years of neglected electronics.
  - Due to this backlog, producer plan obligations may be met within the first few months of the year, as was the case in the first years of the CDRA when CRT televisions faded and smaller, lightweight electronics proliferated.<sup>15</sup>
  - Multiple strategies have emerged to tackle this transitional challenge.
    - Some states implement a phased approach, in which the program begins with limited scope targeting certain types of devices, which then expands in the second and third plan years.
    - Others prioritize the most problematic accrued devices in the first year or two, with temporarily increased incentives for the most hazardous devices, such as CRT televisions.
    - In some regions, temporary assistance programs have been implemented, offering state subsidies to manufacturers or recyclers directly for processing through the backlog of older and more hazardous equipment.
  - Notably – the longer the state continues without an e-waste solution, the larger the backlog, and the more difficult this transitional period will be.



- Use preexisting accreditation and fee structures for efficient stakeholder management.
  - There is no need for the Pennsylvania DEP to reinvent the wheel. Rigorous industry accreditations already exist in the electronics recycling industry, and the DEP can utilize the third-party audited R2v3 and e-Stewards certification standards to ensure only responsible recyclers participate.
  - As is the case with New Jersey's \$15,000 annual enrollment fees for authorized recyclers, participation fees for authorized recyclers and manufacturers can offset DEP administration costs and prevent bad actors from exploiting the system.<sup>17</sup>

## Conclusion

### The CDRA Provides the Foundation

Despite its shortfalls, the CDRA approached the growing e-waste problem in Pennsylvania correctly with an Extended Producer Responsibility model. Unfortunately, the Act was too narrowly tailored, and too incomplete to create a viable e-waste marketplace. With only slight modifications to the CDRA, Pennsylvania can quickly and easily generate a viable market share EPR program like New Jersey's EWMA, while addressing the unique challenge of providing recycling access to our most rural regions.

We can finish what the CDRA attempted. The opportunity to hone and update its provisions so Pennsylvania becomes an electronics recycling leader in the mid-Atlantic is not only attainable, but necessary to prevent the hidden tsunami of e-waste flooding into our state every year. Update the CDRA so producers of the waste stream can honor their disposal obligations; create the bridge needed between electronics producers and recyclers, stimulating a ready-made market for the Commonwealth.



## Endnotes

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