THE UNITED STATES' RECYCLING MODEL IS IN DESPERATE NEED OF A MAKEOVER

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I. INTRODUCTION

Most Americans do not hesitate to throw something away, but a lack of recycling is causing landfills to overflow with products that could be reused and repurposed. In 2017, it was estimated that the average American creates 4.51 pounds of garbage per day, nearly double the amount of the 2.68 pounds Americans produced on average in 1960.[1] Recycling in the United States has become problematic as recycling companies turn away recyclables that have been contaminated with food and other nonrecyclables.[2] The effect is that not nearly enough recyclable products are being repurposed, with many of them ending up in landfills. These landfills are causing environmental harm, including water pollution, land contamination, and the emittance of harmful greenhouse gases such as carbon dioxide and methane into the air.[3] In addition to the environmental benefits linked to increased recycling, there is also the potential for economic gain. For every ten thousand tons of recycling that is removed, thirty-six jobs are created, compared to the six jobs that are created for every ten thousand tons of waste removed.[4]

This comment argues that the current recycling model in the United States is floundering from a lack of federal guidance, particularly inconsistent national recycling policies. Section two will discuss the background and history of the federal laws aimed at reforming municipal waste management practices. Section three

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[1] Renee Cho, *Recycling in the U.S. Is Broken. How Do We Fix It?*, STATE OF THE PLANET (Mar. 13, 2020), https://news.climate.columbia.edu/2020/03/13/fix-recycling-america/.

[2] *Id*.

[3] *Id.*

[4] Fahzy Abdul-Rahman, *Reduce, Reuse, Recycle: Alternatives for Waste Mgmt.*, NEW MEXICO STATE UNIV., (Jan. 2014), https://pubs.nmsu.edu/_g/G314/index.html.

will examine the deficiencies in the United States' reliance on foreign countries for managing its recyclable waste, including China's Operation Green Fence and National Sword policies. It will additionally focus on cities and towns across the United States that have experienced failed recycling strategies and others that have created model recycling and composting programs. Section four of the comment will identify strategies in other countries that have led to successful recycling programs and discusses EPA proposals to improve recycling in the United States.

II. HISTORICAL REVIEW OF FEDERAL LAWS ON MUNICIPAL WASTE MANAGEMENT

Before creating the Recycling and Accountability Act, Congress passed several other bills to promote and regulate recycling in the United States, with varying results. The Environmental Protection Agency (EPA) is the governmental entity in charge of national recycling initiatives, recognizing that "collective and collaborative commitments are best achieved when there are common goals."[5] With this mindset, at the 2020 America Recycles Summit, the EPA Administrator announced that the National Recycling Goal is to "increase the U.S. recycling rate to fifty percent by 2030."[6] Despite the EPA's efforts to increase recycling rates in the United States, Congress has yet to pass a comprehensive recycling law. While strides have been made to protect the environment from hazardous waste pollution in landfills, little has been done at a national level to regulate municipal waste management when it comes to recycling.

The first bill enacted to deal with recycling in the United States was the Solid Waste Disposal Act of 1965 (SWDA), which amended the Clean Air Act.[7] The purpose of the SWDA was to "require standards for controlling the emission of pollutants from certain motor vehicles, to authorize a research and development program

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[5] *U.S. National Recycling Goal,* U.S. ENV'T PROT. AGENCY (Jan. 23, 2023), https://www.epa.gov/recyclingstrategy/us-national-recycling-goal.

[6] *Id.*

[7] Solid Waste Disposal Act of 1965, 42 U.S.C. §6901 (1965).

with respect to solid-waste disposal, and for other purposes."[8] The SWDA was an attempt to improve the "standard of living"[9] by addressing solid waste inefficiencies, which "result in scenic blights, [and] create serious hazards to the public health, including pollution of air and water resources."[10] The increase in consumer waste was included in "other purposes."[11] The Act was a progressive step for the government in "outlin[ing] environmentally responsible methods for getting rid of trash at the household, municipal, commercial and industrial levels[,]"[12] because it "was the first major federal law directed at waste disposal."[13] The SWDA created standards for the disposal of municipal and industrial waste, "promot[ed] waste management technology", and made municipalities responsible for waste management.[14]

The next major advancement in municipal waste management occurred in 1976 with the passage of the Resource Conservation and Recovery Act (RCRA), which again sought to deal with "the 'rising tide' in scrap, discarded, and waste materials."[15] The RCRA was a response to the boom in disposable packaging, roadside litter, and cities running out of space in their landfills.[16] Congress enacted the RCRA to reduce the amount of waste that could not be repurposed in an economical manner.[17] The RCRA defined solid waste as "garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded

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[8] *Id.*

[9] *Id.*

[10] *Id.*

[11] *Id.*

[12] *Solid Waste Disposal Act [SWDA] Law and Legal Definition*, USLEGAL.COM, https://definitions.uslegal.com/s/solid-waste-disposal-act-swda/ (last visited on Oct. 19, 2022).

[13] Jason Gordon, *The Solid Waste Disposal Act - Explained*, THE BUS. PROFESSOR (Apr. 8, 2023), https://thebusinessprofessor.com/en_US/environmental-law/solid-waste-disposal-act (last visited on Sept. 25, 2022).

[14] *Id*.

[15] Am. Mining Cong. v. U.S. E.P.A., 824 F.2d 1177, 1179 (D.C. Cir. 1987).

[16] Kovacs & Klucsik, *The New Federal Role in Solid Waste Management: The Resource Conservation and Recovery Act of 1976*, 3 COLUM. J. ENV'T. L. 205, 216–59 (1976).

[17] 42 U.S.C. § 6901.

material . . . resulting from industrial, commercial, mining, and agricultural operations, and from community activities . . . ."[18] The importance of the RCRA is that it created liability for failing to properly dispose of waste.[19] Courts have construed the meaning of the RCRA to determine that material is not considered "waste" until it has been thrown away by the user.[20] In other words, materials are not considered waste until they are abandoned and no longer being used for their original purpose.[21] Under the RCRA "[d]isposal (or intent to dispose) can trigger criminal liability, but liability is also triggered when the material is stored (without a permit) before or in lieu of disposal."[22]

In 1984, Congress enacted the Hazardous and Solid Waste Amendments (HSWA) to the RCRA, which called for general administration by the Administrator of the EPA to carry out the RCRA's purpose (including funds for resource recovery and conservation panels, hazardous waste management, and support for state, regional, local, and interstate agency solid waste plans).[23] Resource recovery refers to "separating materials from waste that can be recycled into new products or used as an energy alternative to fossil fuels."[24] The resource recovery and conservation panels included "technical, marketing, financial, and institutional specialists" who provide service without charge to state and local government.[25] The HSWA served "to restrict land disposal of all listed and characteristic hazardous wastes,"[26] and had a lasting effect in that "[l]and disposal of hazardous wastes is now prohibited unless EPA treatment standards have been met."[27] Under the HWSA,

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[18] 42 U.S.C. § 6903.

[19] Kovacs & Klucsik, *supra* note 16, at 228.

[20] Hendrian v. Safety-Kleen Sys., Inc., No. 08-14371, 2014 WL 117315, at *9 (E.D. Mich. Jan. 13, 2014).

[21] *See id.*

[22] United States v. Evertson, 320 F. App'x 509, 512 (9th Cir. 2009).

[23] Hazardous and Solid Waste Amendments of 1984, Pub. L. No. 98-616, 98 Stat. 3221 (codified as amended at 42 U.S.C. § 6901).

[24] *What is Resource Recovery?,* GRASSHOPPER ENV'T PTY LTD, https://grasshopper.net.au/what-is-resource-recovery/ (last visited Nov. 8, 2023).

[25] Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6913.

[26] *Wrongful Handling or Disposal of Solid or Hazardous Waste: § 24 Land Disposal Restrictions*, 40 AM. JUR. 3D (1997).

[27] *Id*.

Congress granted the EPA authority to promulgate rules that would address past waste mismanagement.[28] These amendments were particularly important because they established a permitting process for scheduling the cleanup of hazardous waste.[29] Although the HWSA was a step in the right direction, it created complications in the "division of authority between the federal government and the states."[30]

In the 1990s Congress passed two acts aimed at regulating municipal waste. The first of these was the Federal Facility Compliance Act of 1992 (FFCA) which required the Administrator of the EPA to establish:

> (1) "a program to assist small communities in planning and financing environmental facilities" and
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> (2) "a Small Town Environmental Planning Task Force."[31]

The FFCA was an important amendment to the RCRA because it subjected the federal government to both civil and administrative penalties, even if the government deemed these penalties to be "punitive or coercive in nature"[32] as they related to environmental regulations for hazardous waste facilities. This meant the federal government would be held accountable for failing to dispose of hazardous waste in conformity with RCRA standards.[33] The Small Town Environmental Planning Task Force was created to represent small towns from across the United States, agencies from all levels of government, and public interest groups.[34] The task force lasted two years and worked to ensure small town compliance with federal

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[28] Ciba-Geigy Corp. v. Sidamon-Eristoff, 3 F.3d 40, 42 (2d Cir. 1993).

[29] *Id*.

[30] *Id*. at 42-3.

[31] Federal Facility Compliance Act of 1992, Pub. L. No. 102-386, 106 Stat. 1505, 1514.

[32] Margaret K. Minister, *Federal Facilities and the Deterrence Failure of Environmental Laws: The Case for Criminal Prosecution of Federal Employees*, 18 HARV. ENV'T. L. REV. 137, 160 (1994).

[33] *Id.*

[34] 42 U.S.C. § 6908.

environmental regulations under the EPA.[35] Small towns were defined as "an incorporated or unincorporated community [. . .] with a population of less than 2,500 individuals."[36]

The second act passed during the 1990s was the Land Disposal Program Flexibility Act of 1996 (LDPFA), which dialed back some of the land disposal prohibitions that had been part of the HWSA.[37] This act established exemptions for land disposal, which included municipal waste[38] for small municipal solid waste landfills that received a daily average of fewer than twenty tons of municipal waste.[39] Specifically, the LDPFA sought to reduce disposal burdens for small municipal waste landfills by creating allowances for water treatment of "certain low-risk wastes that already are regulated under the Clean Water Act or Safe Drinking Water Act."[40] The act further required the EPA to conduct a study to ensure there would not be any risks created by the act that were not being addressed by other state or federal laws.[41] The EPA was permitted under presidential authorization to promulgate any rules required to address such risks.[42] The intent of the act was to reduce burdens on small municipal landfills while preserving environmental protections.

In 2021, Congress sought to increase the environmental regulations around recycling by implementing the Compost Act. This was "the first time the nation saw a bill dedicated to compost[ing]."[43] The purpose of the act was to "require the designation of composting as a conservation practice and activity,

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[35] *Id.*

[36] *Id.*

[37] *See generally*, Land Disposal Program Flexibility Act of 1996, 16 U.S.C. § 1602 (1996).

[38] 16 U.S.C. § 1602 (1996).

[39] Jeffrey M. Gaba & Donald Stever, 1 L. OF SOLID WASTE, POLLUTION, PREVENTION AND RECYCLING § 4:9 (2022).

[40] Presidential Statement on Signing the Land Disposal Program Flexibility Act, 1996, 32 WEEKLY COMP. PRES. DOC. 13 (Apr. 1, 1996).

[41] *Id.*

[42] *Id.*

[43] Frank Franciosi, *The Senate Has Passed the Recycling and Composting Accountability Act*, U.S. COMPOSTING COUNCIL (Aug. 15, 2022), https://www.compostingcouncil.org/news/614091/The-Senate-Has-Passed-the-Recycling-and-Composting-Accountability-Act.html.

and to provide grants and loan guarantees for composting facilities and programs, and for other purposes."[44] The act defined composting as a conservation effort and activity.[45] It focused on farming practices that produced compost from organic waste that is "generated on a farm" or "brought to a farm from a nearby community and used to produce compost on that farm[,]" in addition to "the use and active management of compost on a farm."[46] Unfortunately, the bill did not pass, but it does illustrate Congress's desire to increase sustainability in the United States.

After the Compost Act failed, a new bill was introduced in 2022 to advance national recycling and composting efforts. Senator Carper from the Senate Committee on Environment and Public Works presented the Recycling and Composting Accountability Act before the United States Senate, which subsequently passed the bill unanimously on July 28, 2022.[47] The bill was sent to the House of Representatives but was never approved.[48] The purpose of the bill was to "require the Administrator of the EPA to carry out certain activities to improve recycling and composting programs in the United States, and for other purposes."[49] The bill was a bipartisan effort, and it explained that "recycling and composting conserve resources, protect the environment, and are important to the United States economy."[50] More specifically, the bill required the EPA to establish "data collection and reporting requirements for recycling and composting programs,"[51] and implement "a national

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[44] H.R. 4443, 117th Cong. §1 (2021).

[45] *Id.*

[46] *Id.*

[47] *All Information (Except Text) for S.-3743 - Recycling and Composting Accountability Act*, CONGRESS.GOV (2023), https://www.congress.gov/bill/117th-congress/senate-bill/3743/all-info?s=1&r=16&q=%7B%22search%22%3A%5B%22BEST+Act%22%5D%7D (Aug. 2, 2022).

[48] *Id.*

[49] S. Res. 3743, 117th Cong. (2022).

[50] *Id*.

[51] DeAnne Toto, *Updated: Senate Passes Recycling, Composting Legislation*, RECYCLING TODAY (Aug. 2, 2022), https://www.recyclingtoday.com/article/senate-passes-rural-recycling-national-composting-legislation/.

composting strategy to reduce contamination rates for recycling."[52] Although the 2022 bill was not passed, the Recycling and Composting Accountability Act was reintroduced before the 118th Congress during the 2022-2023 session,[53] signaling a continued federal interest in improving waste management practices in the United States.

III. THE ISSUE

Recycling and composting in the United States is not a new concept. Before municipal waste management started in the 1890s, people were reducing the amount of waste that accumulated in their homes by finding ways to repurpose products and turn refuse into something usable.[54] Any items that could not be reused were simply thrown into the streets.[55] As early as 1930, garbage was collected from cities and disposed of in rudimentary landfills.[56] One of the first national organizations to encourage recycling was Keep America Beautiful, which started in 1953.[57] Recycling during the 1950s was not developed to make the most out of materials as it had been in previous generations, but rather, to deal with the amassing amounts of refuse that began accumulating after the increased production of products during and after World War II.[58] Today, America enjoys a consumerist-based society, where most people do not hesitate to dispose of products that could be recycled and reused for other purposes. Despite the change in the treatment and philosophy towards municipal waste, the United States has failed to implement a workable national recycling program.

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[52] *Id*.

[53] Recycling and Composting Accountability Act, S. 1194, 118th Cong. (as reported by S. Comm. on Env't. and Pub. Works, June 22, 2023).

[54] Stefan Harzen, *A Short History of Solid Waste Management*, TARAS OCEANOGRAPHIC FOUN. BLOG (Oct. 10, 2020), https://taras.org/2020/10/10/a-short-history-of-solid-waste-management/.

[55] *Id*.

[56] *Id*.

[57] Olivia B. Waxman, *The History of Recycling in America is More Complicated Than You May Think*, TIME (Nov. 15, 2016), https://time.com/4568234/history-origins-recycling/.

[58] *Id*.

A. Exporting Recyclables is an Untenable Long-Term Solution for the United States

In the 1990s, the United States began to deal with the growing accumulation of recyclables by sending them to China.[59] The relationship between the two countries was symbiotic; China would send its exports to the United States, and the United States in turn would send its recyclables back to China on ships that would otherwise return empty.[60] During the beginning of this relationship, China was lacking recyclable materials to turn into new products, and many Chinese recycling businesses sought out foreign recyclables.[61] It is estimated that by 2016, the United States was sending almost 700,000 tons of recyclables to China.[62] Unfortunately, China realized that many of the recyclables they were receiving were contaminated by food or covered in plastic wrap, making these products unusable.[63] China found itself in the same predicament as the United States is now, with many of these products causing landfills to overflow, and ending up in undesirable areas, such as crop fields.[64]

To deal with these contaminated recyclables, China instituted the "Operation Green Fence program, which placed restrictions on imports of recyclable materials that were considered contaminated."[65] Operation Green Fence called for strict inspections and prevented shipments with more than 1.5% contaminants.[66] Such prohibited items included "wood, metal, glass

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[59] Alana Semuels, *Is This the End of Recycling?*, THE ATLANTIC (Mar. 5, 2019), https://www.theatlantic.com/technology/archive/2019/03/china-has-stopped-accepting-our-trash/584131/.

[60] Christopher Joyce, *Where Will Your Plastic Trash Go Now That China Doesn't Want It?*, NPR (Mar. 13, 2019), https://www.npr.org/sections/goatsandsoda/2019/03/13/702501726/where-will-your-plastic-trash-go-now-that-china-doesnt-want-it.

[61] *Id*.

[62] *Id*.

[63] *Id*.

[64] *Id.*

[65] Colin Parts, *Waste Not Want Not: Chinese Recyclable Waste Restrictions, Their Global Impact, and Potential U.S. Responses*, 20 CHI. J. INT'L L. 291, 297 (July 1, 2019).

[66] Jerry Powell, *Operation Green Fence is Deeply Affecting Export Markets*, RES. RECYCLING (Apr. 12, 2013), https://resource-

and plastic."[67] Shipments that were mislabeled were also refused.[68] If a shipment carrying paper had been labeled as plastic bottles, it would be turned away by customs.[69] Any shipments that included "e-scrap, textiles, green waste, animal/human waste, insects, animals, food waste, medical waste," or that were not bundled according to Chinese regulations were also prohibited.[70] As part of Operation Green Fence, China also revoked licenses from Chinese corporations, which reduced the desirability of recyclable materials from the United States due to the decrease in demand.[71] Fortunately for the United States, Operation Green Fence was temporary, ending in November of 2013.[72]

Operation Green Fence was not the end of China's restrictions on recyclable imports. In 2017, China implemented the multifaceted National Sword policy which was aimed at reducing the amount of recyclable waste China would accept from foreign countries, including the United States.[73] "Given their rapid implementation, the recycling restrictions imposed by China . . . had a large impact on the global recycling trade, including large effects on U.S. companies involved in the recyclables supply chain."[74] National Sword was implemented by China as an effort to "protect the environment and improve public health[]" after Operation Green Fence failed to effectively reduce the number of contaminated recyclables that were imported into China.[75] Operation Green Fence did not have a drastic effect on the number of plastics in United States landfills, which can partially be explained by the increased willingness of other countries to accept

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recycling.com/recycling/2013/04/12/operation-green-fence-is-deeply-affecting-export-markets/.

[67] *Id*.

[68] *Id.*

[69] *Id*.

[70] *Id*.

[71] Parts, *supra* note 65, at 298.

[72] *Id*. at 299.

[73] *Id*. at 299-300.

[74] *Id*. at 304.

[75] *China's National Sword Initiative*, INSIDE SOLID WASTE (L.A. Cnty. Solid Waste Mgmt. Comm./Integrated Waste Mgmt. Task Force, L.A., Cal.), Spring 2018, at 5.

foreign recyclables during that time.[76] In contrast, studies have indicated that the National Sword policy has increased plastics in landfills in the United States by at least 23.2%.[77] National Sword not only highlighted the United States' reliance on China to handle its recyclable materials, but also proved that the United States required a better domestic model for recyclable materials.

To combat China's refusal to accept recyclables, the United States has begun exporting recyclables to other countries. Thailand, Malaysia, Vietnam, and Indonesia are among the countries currently accepting recyclables from the United States.[78] The problem is that the United States' failure to create a sustainable recycling model means that recyclable materials are merely being shifted from one part of the world to another. As a result, these countries are running into the same issues as China, as many of the recyclables are unusable due to contamination from food and the incorrect separation of materials.[79] Instead of being recycled into new consumer products, these countries have found that the only way to discard these materials is to burn them.[80] Recyclables in this part of the world are also being used as a source of heat for cooking.[81] The burning of these materials have an impact on the air, water, and land quality of these countries.[82] As a result, countries including Malaysia have already started limiting the amount of recyclable material imported.[83] Similarly, India also announced a ban on imported plastic waste in 2019.[84]

It is not unrealistic to think that these Southeast Asian countries will implement import prohibitions on recyclable materials in the

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[76] *Id.*; Cory Nealon, *UB Research Study Reports the Impact of China's National Sword Policy on the U.S. Landfill and Plastics Recycling Industry*, UNIV. AT BUFF. (Mar. 29, 2022), https://www.buffalo.edu/news/releases/2022/03/029.html.

[77] Nealon, *supra* note 76.

[78] Joyce, *supra* note 60.

[79] *Id*.

[80] *Id*.

[81] *Id*.

[82] *Id*.

[83] *Id.*

[84] Kelley Czajka, *What Does America Do with Recycled Plastic*, PAC. STANDARD, https://psmag.com/news/what-does-america-do-with-recycled-plastic (Mar. 9, 2019).

same manner as China. At that point, the United States will have to again look to create new partnerships with other countries for its recyclable materials, allow these materials to end up in domestic landfills, or–hopefully–create a sustainable model for recycling. The latter option is the only one that prevents the United States from transferring its refuse from one corner of the world to another every time it overburdens a foreign country with its unwanted recyclables.

B. Domestic Recycling Programs

States have attempted to fill the void left by a lack of federal guidance regarding how to deal with recyclable materials, which has resulted in varying outcomes. While some states have been forced to completely abandon curbside recycling collection due to increased rates, other states have found ways to create sustainable solutions to recycling that have allowed them to reach zero waste levels. The disparities in the unavailability of recycling in some areas, contrasted with the abilities of some towns and cities to create effective recycling models, highlights the need for federal guidance on the issue. As of 2020, curbside recycling was available in only thirty-two percent of single-family homes, with over twenty million tons of recyclable materials being disposed of in landfills annually.[85] Without a cohesive national approach to recycling measures, the country will continue to be divided between those who are able to enjoy the benefits of recycling and those whose landfills are increasingly overflowed with items that could otherwise be reused.

i. Recycling Failures–Reduced Service

Philadelphia found itself lacking sanitation workers during the COVID-19 pandemic and thus permitted its residents to throw their trash and recyclables into one bin for disposal.[86] The result was that the entirety of the city's recyclable materials were being disposed of

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[85] Scott Mouw, *2020 State of Curbside Recycling Report*, THE RECYCLING P'SHIP, iv (Feb. 13, 2020), https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2020/02/2020-State-of-Curbside-Recycling.pdf.

[86] Meir Rinde, *Philadelphia Says It's No Longer Mixing Recycling and Trash, But Residents Have Doubts About the Process*, BILLY PENN (July 12, 2022), https://billypenn.com/2022/07/12/philadelphia-recycling-trash-pickup-diversion-rates-survey/.

in landfills.[87] After the Pennsylvania Department of Environmental Protection issued a notice of violation to the city for failing to provide recycling services, Philadelphia reinstated recycling and advised its residents to begin sorting their recyclables again.[88] Residents noted that their recycling was often still collected and emptied into garbage trucks.[89] In July 2022, it was reported that recycling levels in the city had reached a historic low rate, with only "9% of waste collected, compared to 18% a few years ago."[90] City officials noted that the decrease in recycled materials was due to the lighter weight of recyclable products due to advances in packaging technology.[91] Recycling has also become costly to cities that can no longer sell their recyclable materials to countries like China.[92] Instead, cities are charged for the weight of recyclable materials they bring to domestic recycling centers.[93] It has been estimated that Philadelphia currently burns at least half of its recyclable materials "in an incinerator that converts waste to energy."[94] Although burning recyclables prevents them from ending up in a landfill, it also creates issues over air quality. "Burning plastics, in particular, can generate and release pollutants like microplastics, bisphenols, and phthalates" into the air.[95] Philadelphia essentially traded overflowing landfills for increased air pollution.

Other cities and towns across the United States are similarly experiencing difficulties in dealing with their recyclable materials since China implemented its National Sword policy. Broadway,

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[87] *Id*.

[88] *Id*.

[89] *Id*.

[90] Lizzy McLellan Ravitch, *Recycling in Philly: How to Get a Bin, What to Put in It, and Everything Else You Need to Know*, BILLY PENN AT WHYY (Aug. 1, 2022), https://billypenn.com/2022/08/01/how-to-recycle-philadelphia-blue-bin-plastic-glass-cardboard/.

[91] *Id*.

[92] *Id*.

[93] *Id*.

[94] Michael Corkey, *As Costs Skyrocket, More U.S. Cities Stop Recycling*, N.Y. TIMES (Mar. 16, 2019), https://www.nytimes.com/2019/03/16/business/local-recycling-costs.html.

[95] Susan Cosier, *Burning Plastic Can Affect Air Quality, Public Health*, ENV'T FACTOR (Aug. 2022), https://factor.niehs.nih.gov/2022/8/science-highlights/burning-plastic.

Virginia ended its curbside recycling program after its garbage hauler planned to increase its charges for collecting recyclables by sixty-three percent.[96] Although the town had offered to collect recyclables for over twenty years, the lack of a market for recycled products has allowed garbage haulers and recycling centers to increase their rates.[97] Broadway officials did not indicate that the discontinuation of the recycling service would be indefinite, but noted that the town could not economically afford the service and would not reinstate recycling until market rates changed.[98] The town also determined that only half of its residents had routinely been using the recycling service.[99]

Since Broadway canceled its curbside recycling collection, two other local Virginia towns, Timberville and Dayton, have also discontinued the service.[100] Dayton chose to discontinue its recycling service, while Timberville was notified by its garbage hauler that recycling services were being discontinued for their entire area.[101] Recycling haulers, like the one servicing Timberville, often discontinue recycling services when there are not enough towns in one area to make collecting recyclables economically feasible.[102] Another local town, Bridgewater, Virginia, had considered canceling its curbside recycling collection but ultimately determined that keeping the service was in their residents' best interests.[103] The local recycling center reported that the decrease in curbside recycling services had increased their business as people brought their recyclables directly to the container sites.[104] While these examples from Virginia indicate that some people will

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[96] Mackenzie Lee, *Recycling Program Cancelled in Broadway*, WHSV (June 29, 2018, 5:45 PM), https://www.whsv.com/content/news/Recycling-program-cancelled-in-Broadway-486981261.html.

[97] *Id*.

[98] *Id*.

[99] Monica Casey, *Rockingham County Container Sites See More Items as Towns Ditch Curbside Recycling*, WHSV (Jan. 9, 2019, 1:20 PM), https://www.whsv.com/content/news/Rockingham-County-container-sites-see-more-items-as-local-towns-ditch-curb-side-recycling-504112361.html.

[100] *Id*.

[101] *Id*.

[102] *Id*.

[103] Lee, *supra* note 96.

[104] Casey, *supra* note 99.

continue to recycle despite the unavailability of curbside pickup, it is also likely that many recyclable materials are now ending up in landfills. It further illustrates that one town's decision to cancel curbside recycling services can have a detrimental effect on the availability of recycling for neighboring towns.

ii. Recycling Failures–Increased Fees

Some cities and towns have decided to deal with the rising costs of properly recycling reusable materials by passing the cost onto their residents in the form of a recycling fee. Safford, Arizona is one such town, and announced in 2021 that the "blue recycling bins introduced in 2015 will be removed."[105] It also announced that it would increase trash pickup to twice weekly and that residents interested in maintaining their curbside recycling services could do so for a three dollar monthly charge.[106] The new recycling format would come with a reduction in the types of recyclables that would be accepted due to previous recycling collections being mixed with unrecyclable trash.[107] The town cited a drop in recyclables accepted by China and rising fuel costs as reasons for the change in its recycling program.[108] Additionally, the town noted that finding a hauler willing to pick up recycling was becoming a problem, and that a large volume of recycling was necessary to compensate for fuel costs to haul the recyclable material.[109]

Athens, Georgia is another town experiencing an increase in the cost of recyclable pickup by trash haulers. Officials from Athens reported that in 2019 the cost to recycle was "$72 per ton, compared to $42 per ton to bury it in the landfill . . . ."[110] The increase in recycling rates is threatening to surpass the town's budgeted

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[105] David Sowders, *Safford to Modify its Recycling Program*, E. ARIZ. COURIER (Apr. 27, 2019), https://www.eacourier.com/news/safford-to-modify-its-recycling-program/article_7179313a-68ec-11e9-a87f-638c45beb61e.html.

[106] *Id*.

[107] *Id*.

[108] *Id*.

[109] *Id*.

[110] Lee Shearer, *Recycling Costs Rising*, ATHENS BANNER-HERALD, https://www.onlineathens.com/story/news/politics/county/2019/06/13/recycling-costs-rise-as-china-ban-ripples-out-to-athens/4906715007/ (June 14, 2019, 5:44 PM).

allotment for recycling fees.[111] It is believed part of the increase is due to residents not properly sorting their recyclables and throwing trash and other contaminants into their recycling bins.[112] Athens' officials did not indicate any intent on passing the increased costs on to their residents, but may use the money raised from optional sales taxes to improve recycling facilities.[113] Many citizens have the desire to recycle, but towns and municipalities are finding it difficult to maintain a recycling program at an affordable cost for their residents. A national recycling program would go a long way in ensuring towns like Athens do not abandon recycling altogether.

iii. Recycling Successes

A lack of federal guidance on recycling has not spelled disaster for recycling in all cities and towns across the United States. Some states have decided to create sustainable models on their own, with many of them focusing on recycling-forward practices and charging for trash pickup on a "pay-as-you-throw" basis. These communities have realized that incentivizing recycling by making it socially preferable to disposing of reusable goods has helped create sustainable recycling models. While some states have chosen to drive these models through taxes, others have bolstered their recycling successes by offering free recycling services. Despite the different approaches, all these cities have been determined to make their communities environmentally aware of the impacts of improper waste disposal and are working to reduce or eliminate their waste production. These cities demonstrate that creating a successful recycling model in the United States is possible.

Malden, Massachusetts implemented a program where it charges its residents for trash but "picks up recycling and yard waste for free."[114] Malden is one of 1,200 towns that participate in a pay-as-you-throw program.[115] Residents must place their garbage in

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[111] *Id*.

[112] *Id.*

[113] *Id.*

[114] Alana Semuels, *The Trash Man Is Watching You*, THE ATLANTIC (June 26, 2015), https://www.theatlantic.com/business/archive/2015/06/recycling-enforcement/396734/.

[115] *Id*.

specially marked bags; otherwise, they will not be collected by the trash hauler.[116] The town charges one dollar for a fifteen-gallon bag and two dollars for a thirty-three gallon bag.[117] The program is designed to encourage residents to compost and recycle more of their refuse rather than throwing it into a garbage bag.[118] And the city has seen success from the program. Between 2006, when the program was implemented, and 2013, the town's trash collection was reduced by half.[119] Town officials believe their program is successful because it is in the residents' best financial interests to recycle more and throw away less since they are paying for each garbage bag individually.[120] It has also saved the town money on costs for trash hauling.[121] Essentially, the town has flipped the trash-recycling model by requiring residents to pay for trash and offering recycling for free. This model requires a resident to consider whether something is really garbage before throwing it away and to consciously consider whether it can be recycled.

Another city that is using a nontraditional approach to recycling is San Jose, California. San Jose was one of the first to implement a curbside recycling collection program in 1985 and is a leader in waste management with "one of the highest diversion rates in the country[.]"[122] Part of its success is due to a collaboration between two waste management companies where one company picks up all the recycling and organic material, processes the recyclables, and then passes the organic material on to a second company.[123] Thanks to this model, the city "diverts approximately 74 percent of its waste away from landfills."[124] San Jose also "opened the first commercial-scale dry fermentation anaerobic digestion and in-vessel composting

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[116] *Id*.

[117] *Id.*

[118] *Id.*

[119] *Id.*

[120] Semuels, *supra* note 114.

[121] *Id*.

[122] *Zero Waste Case Study: San Jose*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/transforming-waste-tool/zero-waste-case-study-san-jose (May 11, 2023).

[123] Becca Brewer, *Recycling Envy: Ten American Cities with Excellent Practices (2022)*, BUSTED CUBICLE, https://www.bustedcubicle.com/outside/top-american-cities-recycling (last visited Dec. 16, 2023).

[124] *Id*.

facility in the U.S. in 2013."[125] The city additionally participates in a pay-as-you-throw program, where residents pay for specific-sized garbage carts instead of paying for regular trash collection.[126] Residents are able to leave additional trash bags out for pickup and are charged a fee for each bag.[127] The model allows people to pay less when they opt to recycle items instead of placing them out for trash collection.

San Jose's recycling efforts have been bolstered by a new law in California that seeks to reduce the amount of unnecessary food disposal. The composting and organics recycling law requires that "not less than 20 percent of edible food that is currently disposed of is recovered for human consumption by 2025."[128] The new law also includes sanctions for jurisdictions that do not meet the reduced food disposal rates by the following schedule: thirty percent recovered by 2023, sixty-five percent recovered by 2024, and one hundred percent recovered by 2025.[129] These penalties will not take effect until two years after the law is passed.[130] This law shows California's commitment to preventing unnecessary waste and encouraging the composting and recycling of organic materials.

Boulder, Colorado is another city with a mission to permanently reduce the quantity of recyclable material that ends up in landfills. Boulder increased its landfill diversion rates from seventeen percent in 2005 to fifty-three percent in 2022, and increased its recycling and composting rates from ten percent in 2005 to thirty-five percent (recycling) and twenty-one percent (composting) in 2022.[131] Part of the success in Boulder lies in its taxation practices, which allowed the city to build a recycling center that is equipped to "handle household recyclables and hard-to-recycle materials as well."[132] In another taxation measure, the residents of Boulder voted in 1994 to implement an occupational trash tax, not to exceed $3.50 per month

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[125] *Zero Waste Case Study: San Jose*, *supra* note 122.
[126] *Id*.
[127] *Id*.
[128] CAL. PUB. RES. CODE § 42652.5(a)(2) (West).
[129] *Id*. § 42652.5(a)(5)(B)(i)-(iii).
[130] *Id.* § 42652.5(a)(6).
[131] Brewer, *supra* note 123.
[132] *Id*.

per household.[133] The revenue raised from these taxes has allowed the city to create a zero-waste initiative, provide curbside compost collection, allow for single-stream recycling, and purchase land for facilities that specialize in hard-to-recycle materials.[134] The city also requires all special events to have designated recycling and composting bins.[135] Boulder is a great example of how cities can turn what was once a dismal recycling system into one that now serves as a model for the rest of the country.

These cities and towns prove that creating a robust recycling program is possible in the United States. Changing the waste disposal model from one that is focused on the disposal of garbage to one that is focused on recycling has helped these communities divert recyclable products away from landfills. It has also helped to shift the mindsets of residents who now consider whether an item is compostable, recyclable, or capable of being repurposed before throwing that item away. This has helped to reduce the need for landfills in these communities and, in some instances, brought them to a zero-waste level. If these models were implemented on a national scale, it would not only decrease the amount of trash that is managed in the United States but would also reduce or replace our reliance on foreign countries for disposing of our unwanted items.

IV. SOLUTION

An important part of improving the recycling model nationally in the United States is changing the mindset regarding consumerism and how companies create their products. Another key component is embracing a circular economy. The EPA explains that a circular economy "reduces material use, redesigns materials, products, and services to be less resource intensive, and recaptures 'waste' as a resource to manufacture new materials and products."[136] The point of a circular economy is that it moves away from a linear approach where materials are used and thrown away, and instead focuses on

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[133] *Id*.

[134] *Id*.

[135] *Id*.

[136] *What is a Circular Economy?*, U.S. ENV'T PROT. AGENCY, https://www.epa.gov/recyclingstrategy/what-circular-economy (Dec. 14, 2023).

a circular approach where materials can be used, recycled, and then re-used to create a new product.[137] This extends the lifespan of raw materials and prevents a drain on natural resources and goods that have not reached the end of their lifecycle by allowing them to re-enter the stream of commerce.[138]

The benefits of a circular economy go beyond just improving a recycling model. A circular economy "tackles climate change and other global challenges, like biodiversity loss, waste, and pollution[.]"[139] It also serves to "protect the environment, improve economics, and elevate social justice."[140] A circular economy would allow communities to become less dependent on landfills for disposing of their waste, which would have a beneficial trickling effect on consumers. Fewer landfills would mean less opportunities for waterways to be polluted and would improve air quality. It would also decrease the number of natural resources that would need to be extracted from the earth–which the United Nations' International Resource Panel has determined causes half of the global greenhouse emissions.[141] Adopting a circular economy would require the United States to manage municipal waste more effectively on a national level and is a concept that has been successfully implemented in other countries.

A. International Recycling Programs

Countries that have created successful recycling programs all have the following characteristics: funding, behavioral and financial incentives, comprehensive legislation, and clear benchmarks for future recycling goals.[142] Many of these countries have also adopted a reverse focus on waste management where recycling is viewed as the primary resource collected, instead of being a secondary option

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[137] *What is a Circular Economy?*, ELLEN MACARTHUR FOUND., https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview (last visited Oct. 20, 2022).

[138] *Id*.

[139] *Id*.

[140] U.S. ENV'T PROT. AGENCY, *supra* note 136.

[141] *Id.*

[142] *Germany is the World's Leading Nation for Recycling*, CLIMATE ACTION (Dec. 11, 2017), https://www.climateaction.org/news/germany-is-the-worlds-leading-nation-for-recycling.

to waste disposal.[143] Citizens in these countries consider throwing items away as a last resort and not as a means of getting rid of unwanted items.[144]

Countries with success in recycling charge fees to dispose of waste instead of charging to recycle products, and in some instances, require that producers fund the collection of key recyclables.[145] They also place "restrictions on residual waste bins[]" and incentivize recycling not only through deposit refunds but also through social constructs where people would feel embarrassed to throw something away that could be reused.[146] The United States should look to the recycling models implemented by these countries to create a national model that normalizes recycling as much as America normalizes waste disposal.

i. Germany

Germany is the world's leading nation for recycling because of its national focus on minimizing waste and maximizing recycling, which has the added benefit of reducing its environmental impact. Recycling started in Germany in the nineteenth century as a simple waste management system that has grown into the robust, comprehensive system that it has today.[147] Recycling is nationally governed by The Waste Management Act, which started in 1972.[148] Currently, Germany reports that 66.1% of its municipal waste is recycled.[149] Its total recycling rate is seventy-nine percent.[150] The difference in rates is due to the inclusion of manufacturing waste,

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[143] *See id.*

[144] *See generally id.*

[145] *Id.*

[146] *Id.*

[147] Audrey Burran, *Leading Through Example: Germany's Recycling Program*, BORGEN MAG. (Sept. 3, 2021), https://www.borgenmagazine.com/recycling-program/.

[148] *Id.*

[149] *Id*.

[150] Brian Brassaw, *Germany: A Recycling Program That Actually Works*, EARTH 911 (July 11, 2017), https://earth911.com/business-policy/recycling-in-germany/.

which is recycled before it ever reaches consumers.[151] Both rates are still considerably higher than recycling rates in the United States.

Germany owes its recycling success, in part, to the easy color-coded recycling system it has created. Citizens sort their glass into separate containers according to color: blue bins for paper, yellow bins for plastic, brown bins for compost, and anything that cannot be recycled is placed in black bins.[152] The color-coded system makes it easy for people to know which recyclables go into which container, even when they are out in public.[153] The system requires Germans to sort their own recycling, which saves time when it is processed later.[154] Most Germans use recyclable bags and containers to avoid sorting through their trash, and each container is picked up at designated times throughout the month.[155] There is also a charge for some glass containers at the point of purchase, but citizens can return those containers for a return of their deposit fee.[156] Batteries are also collected for recycling at most shopping centers.[157] Any large items that cannot be placed in designated bins, such as furniture and electronics, can be placed curbside at designated times and they will be taken away by municipal waste vans.[158] The recycling market is so large in Germany that, most times, these items are collected by secondhand dealers for resale before they can be picked up by the municipality.[159] Germany has integrated recycling as a normal part of everyday life through its efficient and effective recycling model.

Germany's success in recycling can also be attributed to the Green Dot system that it has implemented. Manufacturers must pay a fee to a waste management facility based on the packaging of their

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[151] *Id*.

[152] *Id*.

[153] *Id*.

[154] Burran, *supra* note 147.

[155] *All About Recycling in Germany*, HOW TO GERMANY, https://www.howtogermany.com/pages/recycling.html (Oct. 11, 2022).

[156] *Id*; *How to Recycle in Germany*, ARCHER RELOCATION, https://www.archer-relocation.com/how-to-recycle-in-germany/ (last visited Nov. 10, 2023).

[157] *All About Recycling in Germany*, *supra* note 155.

[158] *Id*.

[159] *Id*.

products.[160] The more packaging a product has, the higher the fee a manufacturer will pay.[161] The Green Dot system "has led to less paper, thinner glass and less metal being used, thus creating less garbage to be recycled."[162] This program requires manufacturers to take responsibility for all components of product packaging including: "transportation packaging, secondary packaging (i.e., the box around soda cans) and the primary packaging (i.e., the soda can)."[163] It is estimated that the program has reduced garbage by one million tons per year.[164] The Green Dot system is being used in twenty-nine countries across Europe with great success, and the funds generated by the program have been used in the collection, sorting, and recovery of used (mainly household) packaging.[165]

In addition to the Green Dot system, Germany enacted the Closed Substance Cycle and Waste Management Act, the implementation of which started in 1996.[166] The act "applies to anyone that produces, markets or consumes goods and dictates that they are responsible for the materials' reuse, recycling or environmentally sound disposal."[167] Although the act's purview appears broad, it is mainly focused on producers, ensuring their commitment to waste prevention, waste recovery, and waste disposal that can be done in an environmentally safe way.[168] The act creates a hierarchy of waste disposal for producers where the focus is on creating products and using packaging that has a long life cycle and can be repurposed for other uses.[169] The Closed Substance Cycle and Waste Management Act is a key component of Germany's dedication to a circular economy because it compels producers to be mindful of the packaging they use and to consider

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[160] *Id*.

[161] *Id*.

[162] *Id*.

[163] Brassaw, *supra* note 150.

[164] *All About Recycling in Germany*, *supra* note 155.

[165] *Who We Are*, PRO EUR., https://www.pro-e.org/about-us/who-we-are (last visited Nov. 10, 2023); *The Green Dot Financing Symbol*, PRO EUR., https://www.pro-e.org/the-green-dot-trademark (last visited Nov. 10, 2023).

[166] Brassaw, *supra* note 150.

[167] *Id.*

[168] *Id.*

[169] *Closed Substance Cycle Waste Management Act*, IISD EARTH NEGOT. BULL., https://enb.iisd.org/consume/closed.html (last visited Nov. 10, 2023).

where the packaging will end up after it has reached consumers. This is key because careful product design has allowed Germany to minimize the amount of garbage it produces while maximizing its ability to recycle packaging for other uses.

Germany's approach to recycling has been successful because it is comprehensive and simple for its citizens to follow. The programs Germany has enacted are run at a national level, which means that people do not have to consider what recycling laws exist when they travel around Germany. The color-coded system makes it easy to know which recyclables go into which container. The Green Dot system and the Closed Substance Cycle and Waste Management Act ensure that manufacturers participate in the recycling process by minimizing packaging before it reaches consumers and focus on using materials that can be recycled. Germany's approach to recycling has made it a world leader in reducing waste and minimizing landfill use. The United States should look to countries like Germany when considering what changes the United States needs to make in its own recycling model.

ii. South Korea

South Korea is another country whose recycling model has enjoyed great success. In the 1990s, South Korea found itself overcome with a waste management problem as industrialization increased and trash dumps overflowed.[170] For people who lived near the dump sites, the trash was not only unsightly but also threatened to cause major health problems, and as a result, South Koreans protested.[171] People laid down in front of the garbage trucks to prevent the them from bringing more trash to the dump sites.[172] The people's protests against South Korea's waste management conditions spurred the government to act.

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[170] Rivka Galchen, *How South Korea Is Composting Its Way to Sustainability*, THE NEW YORKER (Mar. 2, 2020), https://www.newyorker.com/magazine/2020/03/09/how-south-korea-is-composting-its-way-to-sustainability.

[171] *Id*.

[172] *Id*.

In 1995, South Korea implemented a new trash management strategy focusing on recycling instead of trash collection.[173] Recycling is picked up free of charge, but citizens are charged a rate for trash collection based on the size and number of bags used.[174] Similar to Germany's recycling system, South Korea also uses a designated system for different types of recycled products and imposes a fine for those who do not follow the system.[175] Plastics, glass, metal, and paper are placed into separate bins at the time of disposal, which helps to prevent time spent separating the items at a recycling center.[176] Larger items that cannot be placed into disposal containers can be picked up, but require citizens to pay for a certification sticker.[177] The fee amount depends on the size and weight of the item.[178] South Korea collects smaller electronic items, such as cell phones, at no additional cost.[179] In addition to the organization of trash and recycling collection, South Korea has created penalties for those who do not adhere to the trash separation system and rewards those who report non-compliance.[180] This system has allowed South Korea to change its formerly unhealthy waste management practices into a more sustainable approach with increased accountability from its citizens.

South Korea also focuses heavily on the reduction of food waste. Ninety-five percent of food waste is now being recycled due, in part, to a compulsory household food waste recycling requirement.[181] The program started in 2013 and requires citizens

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[173] *Id*.

[174] *Id*.

[175] *Waste Disposal & Recycling in Korea – Full Breakdown*, SEOULSPACE (Aug. 3, 2023), https://seoulspace.com/waste-disposal-recycling-in-korea-full-breakdown/.

[176] *Id*.

[177] *Id*.

[178] *Id*.

[179] *Id*; *Disposal Procedure by Type of Waste*, DONGDAEMUNGU, https://www.ddm.go.kr/eng/contents.do?key=1054 (last visited Oct. 16, 2023).

[180] *Waste Disposal and Recycling in South Korea*, ANGLOINFO, https://www.angloinfo.com/how-to/south-korea/housing/setting-up-home/waste-recycling (last visited Oct. 19, 2022).

[181] Sally Ho, *Asian Example: Here's How South Korea Is Recycling 95% Of Its Food Waste*, GREEN QUEEN (Feb. 18, 2021),

to purchase disposal bags at six dollars each for all of the food waste thrown out.[182] The government then turns the wasted food into compost, but the fee associated with the disposal bags encourages many citizens to start composting at home.[183] South Koreans also save money from food waste by removing the moisture before disposing of it, which makes it weigh less.[184] Compost created from household food waste is sent to urban farms and community gardens, which also helps reduce the carbon footprint associated with waste collection.[185] Like other successful programs, South Korea's successful food waste minimization is a result of educating its citizens to consider what they are throwing away and finding innovative solutions for items that would have once been considered trash.

iii. India

India helped to divert recyclable products from foreign markets when China enacted its National Sword policy; however, India is now looking towards a more sustainable future with recycling initiatives aimed at increasing the rate of recycled plastics. On World Environment Day in June 2021, India "launched a nationwide awareness campaign on [s]ingle [u]se [p]lastics[.]"[186] India's environment minister explained, "[p]lastic per se is not a problem, it is uncollected plastic waste that is."[187] India's recycling rates are low in comparison to the amount of waste produced by the country, but it is working to improve its recycling model.[188]

The exact recycling rate for India is unknown, but the Central Pollution Control Board estimates that seventy percent of India's

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https://www.greenqueen.com.hk/asian-example-heres-how-south-korea-is-recycling-95-of-its-food-waste/.

[182] *Id*.

[183] *Id*.

[184] *Id.*

[185] *Id.*

[186] Vaibhav Rathi, *Why India Needs A Plastic Recycling Revolution*, OUTLOOK, https://www.outlookindia.com/website/story/society-news-why-india-needs-a-plastic-recycling-revolution/386902 (July 3, 2021, 9:45 AM).

[187] *Id*.

[188] *Id*.

recyclables are currently ending up in landfills.[189] These landfills are often illegally operated and threaten to pollute public drinking water sources.[190] Mumbai has capitalized on the country's growing interest in recyclables and has become a hub for recycling entrepreneurs.[191] It is estimated that approximately 15,000 entrepreneurs have begun recycling in the city at a value of one million dollars.[192] These new businesses not only serve to improve Mumbai's sustainability efforts, but have also created jobs for nearly "250,000 people, as waste collectors, dealers and day labourers."[193]

India currently "recycles 94.17% of waste plastics through mechanical recycling, while 0.93% is chemical or feedstock recycling and 5% [is used] for energy recovery and alternative uses such as making roads, boards, and tiles."[194] Mechanical recycling involves the "sorting, washing, drying, grinding, re-granulating and compounding[]"[195] of plastic waste and "does not change the chemical structure of the material[.]"[196] This allows the products to be turned into new repurposed products more easily.[197] Chemical recycling involves the restructuring of plastics and directly involves fuel and chemical manufacturers.[198] The food processing sector would be the primary industry to reuse the products created by the chemical recycling process.[199]

In addition to India's focus on recycling plastics, the country has vowed to reduce the amount of paper and glass products ending up in landfills, and is trying to gain traction with recycling

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[189] Piotr Dobrowolski, *Recycling in India: A Market in Transition*, WEKA INDUSTRIE MEDIEN, https://waste-management-world.com/recycling/recycling-in-india-a-market-in-transition/ (May 10, 2023).

[190] *Id*.

[191] *Id*.

[192] *Id*.

[193] *Id*.

[194] R. Shanker et al., *Plastic Waste Recycling: Existing Indian Scenario and Future Opportunities*, 20 INT'L J. OF ENV'T. SCI. AND TECH. 5895, 5909 (2022).

[195] *What is Mechanical Recycling?*, TWI GLOB., https://www.twi-global.com/technical-knowledge/faqs/what-is-mechanical-recycling#WhataretheStepsofMechanicalRecycling (last visited Oct. 21, 2022).

[196] *Id*.

[197] *Id*.

[198] Shanker et al., *supra* note 194, at 5903.

[199] *Id.* at 5904.

electronics.[200] India plans to completely ban the disposal of glass and paper products in landfills by 2025.[201] The focus on paper is particularly important to India because the quantity of recycled paper available in India is dropping.[202] This is due, in part, to the improper disposal of paper products, but also because of China's National Sword policy, which caused China to ban the importation of wastepaper.[203] China now purchases craft paper directly from India, which has resulted in a shortage of craft paper that India can use domestically or export to other countries.[204] The hope is that by vamping up paper recycling efforts in India, the country will be able to produce enough recycled paper to use domestically and can resume exporting paper products internationally.[205]

India has experienced less success with its electronics recycling. It was reported that in 2020, only 312 companies were authorized to recycle electronic products.[206] With so few companies authorized to recycle electronics, it is estimated that only a quarter of the electronic waste that India produces is being recycled.[207] Informal recyclers are trying to bridge this gap, but it is feared that if electronic waste is not recycled properly, it could cause more health and environmental problems that the recyclers are attempting to prevent.[208]

Like the United States, India has not perfected recycling yet, but it is working towards a more sustainable future. New companies are emerging at a rapid rate to tackle India's waste management and ensure that fewer recyclable products end up in landfills. The Recycle India Foundation, a country-wide organization focused on e-waste management, currently has 170 recyclers across the country.[209] The organization has started initiatives to encourage safe

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[200] Dobrowolski, *supra* note 189.
[201] *Id.*
[202] *Id.*
[203] *Id.*
[204] *Id.*
[205] *See id.*
[206] Dobrowolski, *supra* note 189.
[207] *Id.*
[208] *Id.*
[209] RECYCLE INDIA FOUND., https://recycleindiafoundation.com/ (last visited Oct. 20, 2022).

plastic disposal, recycling PET [polyethylene terephthalate or polyester] bottles, paper recycling, and organizing rag pickers who remove usable rags from garbage bins for future use.[210] The Recycle India Foundation is just one example of the many organizations that are working to make India a future leader in reducing the number of harmful landfills and ensuring that reusable products are recycled correctly.

B. National Recycling Strategy

Many countries have successfully created recycling programs that could be replicated in the United States, but the EPA has developed a National Recycling Strategy that could also help to end the recycling crisis. In addition to the National Recycling Strategy, the EPA has created the Sustainable Materials Management Program Strategic Plan for Fiscal Years 2017–2022.[211] Together, both programs seek to reduce "the amount of waste sent to landfills and incinerators, which can reduce the amount of air emissions released into the atmosphere[,]" and to "conserve resources and protect the environment."[212] The EPA uses mechanical recycling for its strategy, which is the "series of activities by which discarded or used materials are collected, sorted based on physical/mechanical characteristics, processed and/or converted into feedstock and used in the manufacture of new products."[213]

Three main goals were recognized for the National Recycling Strategy: "1. reduce contamination[,] 2. increase processing efficiency[, and] 3. improve markets."[214] The EPA indicated that the biggest barrier to reducing contamination was a lack of education by consumers, both on what can be recycled and the importance of recycling.[215] It further suggested that education on recycling could be best achieved by consistent packaging, pilot

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[210] *Id*.

[211] ENV'T PROT. AGENCY, NATIONAL RECYCLING STRATEGY 6-7 (2020), https://www.epa.gov/sites/default/files/2020-10/documents/draft_national_recycling_strategy.pdf.

[212] *Id.* at 6.

[213] *Id.*

[214] *Id*. at 10.

[215] *Id*. at 6, 9, 11.

programs for educating the public, and spreading the message on recycling through social media and government outlets.[216] The EPA also suggested that the coordination of recycling programs at the federal, state, local, and tribal levels would assist in creating a cohesive program where best practices can be determined.[217]

Additionally, the EPA recognized that part of the problem with current recycling models is the lack of efficiency in processing recyclables. Recycling technology has not kept up with recycling needs in the United States, in part, due to a lack of public and private funding.[218] A *needs assessment* would also help to determine what geographical areas have recycling, what type of recycling is being conducted there, and at what capacity recyclables are being processed.[219] It was also noted that manufacturers need to be educated on the impact their products have on recycling.[220] It would be beneficial for manufacturers if they were provided with design guides for new product packaging to make their transition to recyclable packaging faster and easier.[221] A metrics system will also need to be designed to measure how well the recycling model is progressing and to help establish benchmarks for improvement.[222]

Finally, the National Recycling Strategy's last component is improving the domestic market for recycled products. The EPA suggested that part of the solution to this issue is creating more transparency around the number of recycled materials that are available and determining what materials manufacturers need.[223] A focus should be placed on recyclables that are environmentally friendly and resilient.[224] A key part of growing the demand for recycled products is examining barriers to creating recycled goods such as contamination, and increasing incentives for companies who choose to use recycled materials in creating new products.[225] One

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[216] *Id*. at 11-12.
[217] NATIONAL RECYCLING STRATEGY, supra note 211, at 12.
[218] *Id.* at 13.
[219] *Id*.
[220] *Id.* at 14.
[221] *Id*.
[222] *Id.*
[223] NATIONAL RECYCLING STRATEGY, supra note 211, at 15.
[224] *Id*.
[225] *Id*. at 16.

of these incentives is the "Demand Challenge partnership program[,]" which recognizes companies for using recycled materials in their products.[226] In addition to recognition, there is also the possibility that companies will receive financial incentives to "increase the demand for recycled materials."[227] Walmart, in collaboration with P&G, is one of the companies taking advantage of the Demand Challenge program by allowing customers to bring empty beauty products to participating Walmart stores to be recycled.[228]

The National Recycling Strategy will be the first time that a recycling plan seek to address "waste, environmental justice, and the climate crisis."[229] Like most EPA measures, it will take some time for the public and manufacturers to become educated about recycling and to determine if the National Recycling Strategy will accomplish the change the EPA seeks. The EPA is hopeful that its national program will make "reduce, reuse, recycle" less of a catchphrase and more of an opportunity for the United States to realize a circular economy where materials are reused, in order to remove the burden on natural resources, improve environmental conditions, and improve human health conditions.[230] Hopefully, the National Recycling Strategy will be a start to the United States becoming more aware of the importance of recycling and in turn change recycling from a strategy to an accepted way of life.

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[226] Justine Calma, *The US Finally Adopts a National Recycling Strategy/ But Recycling Won't Be Enough to Stop Trashing the Environment*, THE VERGE (Nov. 15, 2021, 5:25 PM), https://www.theverge.com/2021/11/15/22783450/recycling-united-states-epa-plastic-pollution-waste.

[227] *The US Finally Implements a Nationwide Recycling System*, GOV CIO OUTLOOK (Jan. 3, 2022), https://www.govciooutlook.com/news/the-us-finally-implements-a-nationwide-recycling-system-nid-1491.html.

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V. CONCLUSION

The United States is behind many other countries when it comes to its responsible waste management practices. The current model remains focused on garbage disposal with recycling as an accessory service. Recycling is not currently being offered in all communities. Those that do offer recycling have found that the cost is rising now that China and other countries are no longer accepting the volume of recyclables that the United States had depended on in the past. Municipalities that offer curbside recycling services often cannot ensure that recyclable materials are processed and turned into other products. Often, these recyclable materials end up in landfills despite the best efforts of American consumers.

The federal government has attempted to revamp the recycling model in the United States since 1965, when the Solid Waste Disposal Act was enacted. Since that time, Congress has passed multiple laws aimed at improving the waste management system on a national level. Many of these laws have served to mitigate hazardous waste concerns, but none of them have addressed the deficiencies of the United States' recycling program. Although the Environmental Protection Agency has attempted to create a National Recycling Strategy, its implementation has been slow at best, and it does not have the robust provisions that have been included in other recycling programs to make them successful. If the United States really wants to tackle its recycling problems, it needs to take measures such as requiring the separation of recyclables before they reach recycling centers, requiring manufacturers to take measures to reduce the amount of packaging for their products, making sure all packaging is recyclable, and mandating penalties for people who do not comply with recycling standards. Without federal guidance, communities will continue to experience disparities in recycling measures, which directly affect poverty rates, contribute to environmental injustice, create pollution, and trigger health problems.