

# **Produce, Reuse, Recycle:**

## Unpacking the evolving role of producers in the U.S. recycling system

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## INTRODUCTION

Cries for help in the financially stressed U.S. recycling industry have proliferated over the past several years, accompanied by blame and finger-pointing between waste management providers, government, and consumer product companies (“producers”) that put single-use materials onto the market. The economic viability of recycling is under question, and new government and industry initiatives are emerging to try to fix the struggling system, which already has among the lowest recovery rates in the developed world.<sup>1</sup> While recycling has historically been the responsibility of state and local governments, some producers have become more involved in supporting these efforts for their products and packaging.

Packaging has gained particular momentum with producers in recent years in response to growing concern from regulators, consumers, and environmental researchers over the adverse economic and environmental impacts of packaging waste. New research has revealed that unrecycled packaging waste contributes significantly to the problem of plastic ocean debris (The Ocean Conservancy, 2015). Experts now assert that there will be more plastic than fish in the ocean by 2050 (The World Economic Forum et al, 2016). Research also shows that the U.S. is the only OECD country represented in the top twenty group of contributors to marine debris (Jambeck et al., 2015). In addition, products and packaging are indirectly responsible for around 40% of U.S. greenhouse gas emissions, and this relationship continues to be better understood (Fitzgerald et al 2012; Stolaroff, Joseph, 2009; EPA, 2013). Product packaging is unique compared to other waste streams in that it is used in nearly every industry and across multiple material types. It is comprised primarily of recyclable materials like paper, plastic, aluminum and glass, and comprises the largest portion of products generated in municipal solid waste, at 30 percent (EPA, 2015). Many of these materials have market value, however, much of this value is lost to landfills in the U.S. Research has shown the value of discarded packaging materials to be \$11.4 billion (MacKerron, 2012).

A handful of leading producers have launched initiatives to help transform the U.S. recycling system so that it can better manage post-consumer packaging materials. This research examines the key problems affecting the recycling industry in the U.S. and then highlights three case studies of industry-led initiatives that aim to address these problems: The Recycling Partnership, The Closed Loop Fund, and Nestle Waters NA Extended Producer Responsibility (EPR). These initiatives exemplify producers’ changing attitude and role in End-of-Life (EoL) management for their products. These efforts aim to protect producers’ bottom line by appeasing governments and consumers, but also demonstrate an emerging interest in the circular economy and how producers can help scale up closed-loop business models for packaging that increase efficiency and decrease risks. This research draws from interviews across the waste industry, government, nonprofits and consumer product companies.

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<sup>1</sup> U.S. recycling rates significantly lag behind those of other developed countries and have been stagnant at around 34% for several years, and actually dropped starting in 2012 (EPA, 2015).

# THE CHALLENGE OF RECYCLING IN THE UNITED STATES

Recycling is largely viewed as a public, environmental service meant to keep communities clean. However, recycling is also the pathway to a secondary marketplace that provides producers with recycled feedstock to re-use in their products. In practice, this post-consumer feedstock is difficult to obtain in sufficient quantity and quality to make many secondary markets profitable. Recycling companies in the U.S. have been unable to supply the growing demand for recycled content by producers at competitive prices.<sup>2</sup> As a result, many of these companies have faced major economic losses, threatened with bankruptcy and forced to close down facilities (Gelles, 2016). Macroeconomic factors underlie this trend, namely the slowing economy in China, which buys half or more of U.S. curbside collected materials, and plummeting crude oil prices, which reduce the cost of virgin materials compared to recycled materials (CalRecycle, 2014; Royte, 2013). Flaws in the U.S. domestic recycling system are also a key factor, which together with global trends culminate in a marketplace failure. These domestic system flaws can be summarized in terms of the following five key barriers:

## *1 Limited Access to Recycling Collection*

Collection is a key point of material loss in the U.S. recycling system. About 50% of the overall packaging generated by weight is collected for recycling, however collection rates for glass, non-corrugated paper, plastics and mixed products are substantially lower, with the majority of these materials discarded and sent to landfills (EPA, 2015).<sup>3</sup> Rural areas have little or no access to public collection services. In addition, lack of access to recycling bins is a problem across the U.S., even where collection services are available. Often bins are not available in public places and commercial areas, which is a problem since people in the U.S. are very mobile across long distances, with many products consumed in numerous locations throughout the day. According to Tim Brown, CEO of Nestle Waters NA, “with the exception of dense, urban areas, the material that people consume in the U.S. is widely dispersed, making it more challenging to collect than if people consumed products in concentrated areas at more regular times, as is more so the case in Europe.”

## *2 Contamination of Recycled Content*

Once materials are collected for recycling, further material losses occur as the result of contamination of the recycling stream. U.S. recyclables have relatively high levels of contamination, which reduces the quality and aftermarket value of these materials. Glass, food waste, and mixing of non-recyclable materials are key problem areas. Contamination has grown with single stream recycling, which now represents almost two-thirds of recycling programs in the U.S. (EPA, 2015). Studies show that single stream systems collect notably larger volumes of recycled materials than other systems (Container

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<sup>2</sup> Few companies are willing to bear the burden of higher recycled material costs - only PepsiCo maintains a consistent level of 10% recycled PET in all product lines sold in the U.S. since 2005 (MacKerron, 2015). However, recyclers note that they are starting to see some larger retailers that are willing to pay a higher price for recycled content so they can say that to the world (Paben, 2016).

<sup>3</sup> With the exception of corrugated boxes and steel packaging, not a single other category of packaging has recycling rates above 55%. While the overall recycling rate for packaging is about 50%, removing these categories, the rate drops to 30%. Material value is a fundamental driver, where materials with higher value tend to have more developed secondary markets and higher recovery rates. High recycling rates for some of these materials therefore masks low recycling rates across other materials.

Recycling Institute, 2009; Pressley et al, 2014). However, this comes at the expense of lower quality from the comingling of pure streams and associated consumer carelessness and confusion when recycling (Grodén, 2015).<sup>4</sup> Contamination can lead to rejected loads at recycling facilities both domestically and abroad. Studies show that 10% of loads are rejected at U.S. facilities (Olie and Wood, 2015). Further, China’s recently implemented Green Fence policy has led to the rejection of 10-30% of U.S.-exported recyclables that are too contaminated and low-quality (CalRecycle, 2014; Royte, 2013).

### **3 Lagging Recycling Technology**

Even if material is collected and loads are accepted by recyclers, further material losses occur during processing. Studies show loss rates of 10-25% occur at single stream facilities (RRS, 2015). Experts identify label separation, film plastics, and mixed products like aseptic containers as key challenge areas. The majority of recycling industry operators in the U.S. are small companies with low-tech, manual sorting (IBIS world, 2016). This system cannot keep up with the “evolving ton”, which consists of a growing variety of plastic polymer combinations and mixed materials.<sup>5</sup> While there are some technologically advanced, automated Material Recovery Facilities (MRFs) in the United States, they are not state of the art globally. Technological investments in the U.S. recycling industry have been stifled by low oil prices and lack of large-scale advancements in the industry. Tom Szaky, CEO of Terracycle, a company dealing with hard-to-recycle waste, cited a deep lack of innovation in the U.S. waste industry, and noted that big haulers are shareholders of his company in every other country they operate in except for the U.S.

### **4 Misaligned Policy Incentives**

Economic incentives and policies work against secondary markets for recycled materials. Policies and pricing structures vary widely across the U.S.<sup>6</sup> This makes it hard to reinforce good behavior and scale systems and is not conducive to overall system improvement. Policies often focus narrowly on collection rates to meet state and local goals vs. the quality of the material that comes out of the bin at the end. Pricing contracts for recycling are typically weight-based, just like landfill contracts, and do not vary based on the value of the materials included, as commodity contracts do. These weight-based contracts also do not provide incentives to reduce contamination, nor do they necessarily reflect environmental priorities, as carbon-based targets would. In addition, the abundance of cheap land for landfills in the U.S. and policies that allow for low landfilling fees mean that materials are often directed towards landfills. Susan Robinson, Federal Public Affairs Director at Waste Management, noted that the average landfill fee in the U.S., about \$45 per ton, is substantially lower than in Europe, which drives a lot of behavior.

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<sup>4</sup> Single stream recycling results in lower costs upstream at the point of collection, and as such is widely preferred by municipal governments. The costs of contamination from this system however translate downstream to MRFs, which must increase their operational expenses to manage the cleaning and sorting of comingled materials.

<sup>5</sup> Most U.S. MRFs were designed to accommodate mostly paper recyclables. Between 2000 and 2013, the amount of paper and paperboard Americans have sent to facilities has dropped 22%. Meanwhile, the volume of plastics—which are less lucrative because their diversity and lightness make them harder to sort—has increased by 27% (EPA, 2015).

<sup>6</sup> The U.S. has around 9,800 different municipal recycling plans that all follow different rules, a reflection of diversity over the country (E.B., 2015). This has led to large inconsistency on what materials are collected, how they are collected, and confusion over governance. Program efficiency varies widely from one community to another and is often constrained by political forces and conflicting budget priorities.

## 5 *Disruptive Packaging Design*

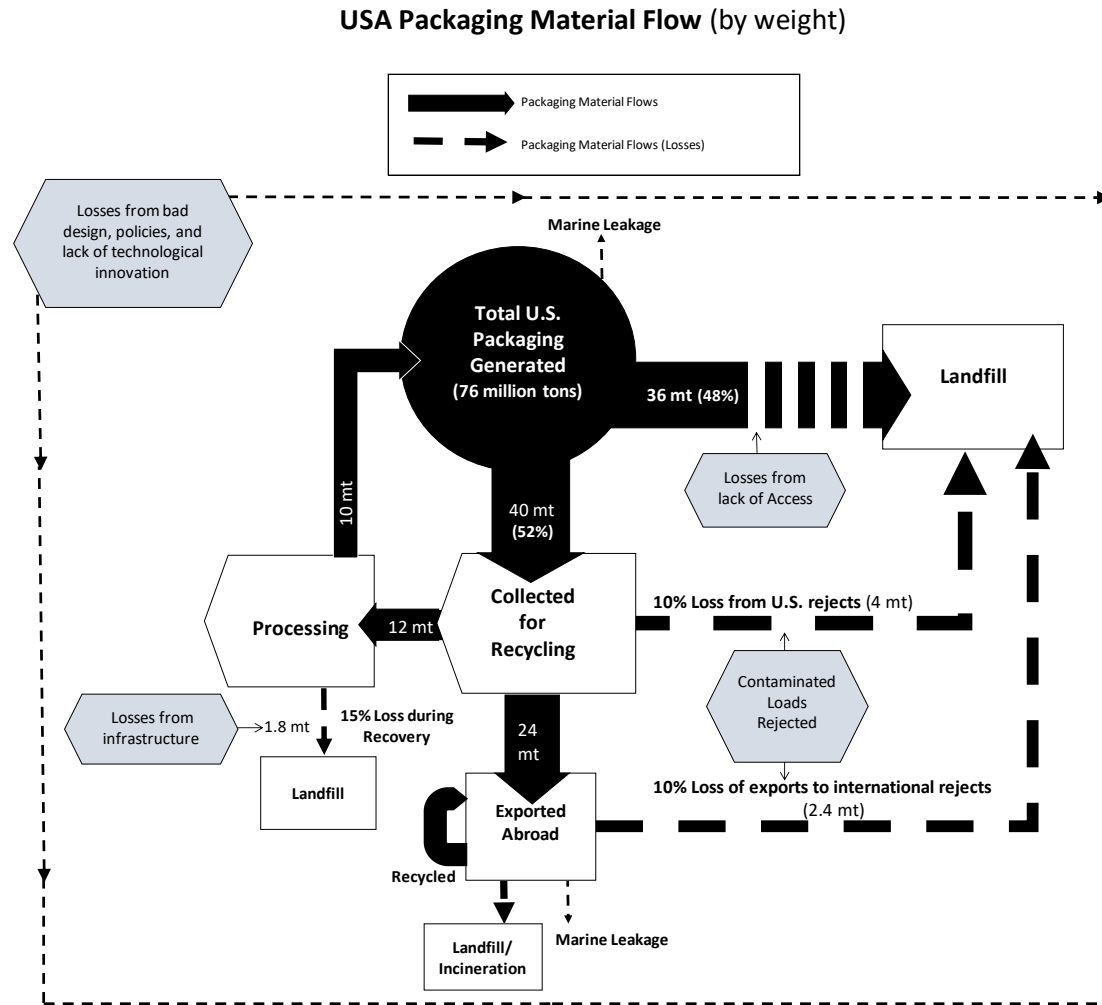
Producers continually launch new packaging designs that disrupt the recycling system. Mixed material packaging, such as aseptic cartons, combines different materials in layers bound together with non-removable adhesives and contaminated with inks and dyes. This practice degrades individual material quality and makes products costly and complicated to recycle. Packaging materials with higher market value, like aluminum, corrugated cardboard, and polyethylene terephthalate (PET) add value to the system. Other materials, such as polystyrene (PS), have little value and no aftermarket, which puts a strain on recycling systems when these materials must be sorted out and discarded. Producers that use higher value materials have a built-in incentive to recover and reuse these materials. However, many producers often use cheap, low-value, or mixed materials.

### **Summary of Key Recycling Challenges**

These five system barriers span the entire recycling system, from design to recovery, which demonstrates the need for intervention at multiple points in the system. *Figure 1* below summarizes U.S. material flows for packaging. Starting with total packaging generated, the diagram depicts how packaging material flows throughout the U.S. recycling system and highlights where losses occur. These flows are aggregated across packaging material types (glass, plastic, paper, and other). Data for these flows was derived from public sources, academic literature, and industry news articles.

The largest losses occur at the point of collection; however, additional losses occur after materials have been collected for recycling. Ultimately only an estimated one fourth of the material collected for recycling is available for re-processing and selling in the U.S. recycling market, with the rest sent overseas or lost to landfill at various points in the system. For more detailed material flow information for packaging recycling by specific material types, see Appendix A.

**Figure 1: U.S. Packaging Material Flow Analysis**



Amounts generated, disposed and recovered based on most recent available EPA data for packaging (rounded) (EPA, 2015). These numbers are likely an underestimate of total quantity, based on recent research of US MSW (Powell et al, 2015). Export data estimated based on report by CalRecycle and online articles (CalRecycle, 2014; Royle, 2013); Exports consider only data on China; Marine debris data is derived from the Ocean Conservancy and research in the Journal, Science (The Ocean Conservancy, 2015; Jambeck et al, 2015). U.S. rejected load data based on average reported loss rate from CIWM study (Olie and Wood, 2015). Data for U.S. MRF losses was obtained by comparing different studies, which report a residual loss rate range of 10-25% for single stream MRFs (Pressley, et al, 2014; Colins, 2012).

## THE EVOLVING ROLE OF PRODUCERS IN END-OF-LIFE PACKAGING

Many producers lack understanding of and accountability for the EoL impacts of the products and packaging they put onto the market. Producers have historically blamed poor recycling rates on the negligent recycling habits of consumers and on governments for not better educating people about how to recycle (Elmore, 2012). They blame the recycling industry for not better adapting to changing market conditions. They also blame each other, with conflicts of interest and blame arising between users of different materials. Until recently, the majority of industry-led efforts have focused on consumer education. While consumer behavior is an important factor in the problem, this perspective demonstrates an incomplete view of the bigger set of issues. As laid out in this analysis, issues of access, governance, product complexity, and technology also play key roles in explaining inefficiencies in the U.S. recycling system.

Some producers have demonstrated an evolving understanding of and commitment to the recycling issue in the U.S. The following section describes three case studies of recent and current producer initiatives that arose specifically to solve recycling problems in the U.S. and enable producers to have better access to secondary materials to use in their products. Although other industry initiatives exist, the case studies selected represent novel producer efforts at the brand-level that go above and beyond simply educating consumers how to recycle. The initiatives are analyzed against the five system barriers identified in order to assess their potential effectiveness in addressing the recycling problem in the U.S.

### *Case Study 1: Nestle Waters NA Expands the Discussion on Producer Responsibility*

Nestle Waters North America (Nwana) launched a major recycling initiative from 2011-2014 that fought for Extended Producer Responsibility (EPR) legislation for packaging in the United States. EPR is a policy tool where recycling costs for certain products are managed and paid for by the producers themselves, in effect shifting accountability for packaging recycling systems to producers. These laws are in place in nearly all developed countries worldwide (PSI, 2015). This initiative represents the first ever industry-led effort for major recycling policy reform in the U.S.

Nwana supported implementation of this policy in the U.S. as a way to significantly improve recycling rates for packaging while leveraging private sector acumen to minimize the system's costs. According to interviews with Paul Gardener and Michael Washburn, some of the initiative's architects, as well as current CEO Tim Brown, Nwana was driven primarily by a major market interest in decreasing the cost of recycled polyethylene terephthalate (PET) to use in its water bottles. Nwana was among the first major corporations to acknowledge that the way the current recycling system works in the U.S. is not conducive to getting this material back for re-use.

The Nwana EPR initiative was pioneered by then CEO Kim Jeffrey. After looking at various strategies globally, Jeffrey saw EPR as the most effective policy tool to increase recycling and also get material back, since producer end-users help manage the material in the system. This policy stands in contrast to container deposit legislation, also known as "bottle bills," which are currently implemented in 10 U.S. states. Under container deposit laws, producers from a narrow range of products pay for, but do not help to manage, recycling for their products. For more detailed information on different policy tools for recycling, see Appendix B.



Kim Jeffrey started Recycling Reinvented, a non-profit organization, to research and advance the case for packaging EPR in the U.S. The main components of the program included: Producers paying 100% of the cost of recycling; products pay differentiated fees based on material use and design; and producers pay according to quantity put on market, with smaller producers exempted. The goal was then to cultivate allies in industry and get bills passed in the U.S., one state at a time (Recycling Reinvented, 2014).

Through Recycling Reinvented and support by other NGOs, Nwana engaged major consumer goods companies to adopt EPR policies. Nwana secured a handful of corporate supporters, namely Coca Cola, Pepsi, and New Belgium Brewing. The beverage industry has historically been active in pioneering recycling efforts due to the stakeholder pressure that it receives from the visibility of beverage litter as well as the valuable, recyclable nature of beverage bottles. Current Nwana CEO Tim Brown asserted that recycling is, “in the highest sector of priorities, fundamental to the company’s long-term success and viability.” By using valuable material in their packaging, beverage companies have a vested interest in getting it back for re-use. Tom Szaky, CEO of Terracycle, called beverage companies, “the archetype of circularity.” Outside the beverage industry, Nwana also gained some support from P&G and Unilever on its EPR initiative.

Despite some support, the EPR initiative received major backlash from most consumer brands, represented through the Grocery Manufacturer’s Association (GMA), such as Colgate-Palmolive, General Mills, Kraft Foods, and Wal-Mart. The GMA contracted a study asserting that EPR for packaging is economically unfeasible, ineffective, and that existing European models would not work in the U.S. (GMA, 2012). Michael Washburn, former VP of Sustainability at Nwana, noted that many of these companies lack a sophisticated understanding of EoL management, often acknowledging the effectiveness of EPR in some countries but resisting it in the U.S. Paul Gardner of Recycling Reinvented noted that many of these companies don’t talk to their European colleagues. The initiative also received backlash from packaging producers in the paper and glass industries, who asserted that this was a ‘bottled water problem’ and that they were not willing to pay into this system.

A packaging EPR bill was introduced in North Carolina, but ultimately no state adopted the proposed Nwana EPR policy. In addition to lack of support from industry peers, governments and the environmental community were also skeptical about turning over program management to brands. The proposed legislation put forward by Recycling Reinvented and Nwana failed to incorporate a role for municipalities, and local governments were concerned about losing control over recycling in their communities. Michael Washburn noted that more thinking on program administration and governance was needed, but now these discussions are starting to happen.

Discussions on better recycling policy are taking place in many states across the U.S. today, and have evolved from a narrow focus on beverages and container deposit laws to include a broader discussion on all packaged goods. Legislators have shown increasing openness to EPR possibilities (Leif and Himes, 2015). Currently, California, Connecticut, Indiana, Massachusetts, Rhode Island, Minnesota, and Vermont are all in various stages of discussing EPR for packaging, with Rhode Island recently introducing a bill. This number increased from only four states in 2015 (PSI, 2016). Over the past several years, Maine, North Carolina, Delaware and Iowa have also discussed EPR for packaging. For a detailed summary of these policy proposals, see Appendix B. Many of the states that Nwana targeted are now working with nonprofit

organizations like Upstream and the Product Stewardship Institute to draft EPR legislation that considers local government roles in “shared” models of EPR, as opposed to the fully producer run model initially perpetuated by NWNA. Cynthia Dunne, Senior Environmental Scientist at CalRecycle, noted that, “now that EPR has been in U.S. for a while for other products, there is a ‘perfect storm’ effect to revisit this topic due to the green fence policy and other cross media impacts of packaging waste, like greenhouse gas emissions and marine debris.” For more information on different kinds of EPR models, see Appendix C.

Many states are also campaigning for updates and expansion of container deposit laws that better reflect the changing waste stream. Cathy Jamieson, Solid Waste Program Manager at the Vermont Department of Environmental Conservation, stated that an alternative to “bottle bills” is the biggest incentive for recycling regulation discussions in her state. Although bottle bills significantly increase recovery rates for covered products, these laws address only a small percentage of the waste stream and erode recycling profitability by removing products with strong commodity value.

NWNA’s EPR initiative marked a significant deviation from the typical producer position of avoiding regulation and deflecting responsibility. The initiative was instrumental in launching an ongoing dialog across the U.S. regarding the role of producers in recycling system management. This initiative demonstrates that in order for producers to support producer responsibility or other policy proposals, the policies cannot just be blank checks from brands, and must serve companies’ economic interests. For some companies, these economic interests include promoting the use of recycled material in the next generation of products or packaging.

### ***Case Study 2: The Recycling Partnership Evolves into Systems Thinking***

The Recycling Partnership is an ongoing collaboration of industry organizations and brands focused on a systemic approach to improving recycling rates for packaging. The Partnership has been around since 2003, but has recently evolved from a narrow focus on consumer recycling education to other systemic recycling problems. Previously known as the Curbside Value Partnership, the group rebranded in July of 2014 on the heels of the NWNA EPR initiative. The Partnership expanded their focus to include issues of access to recycling and quality, and started to offer grants to qualifying municipalities. The vast majority of its grants focus on community upgrades from bin to cart-based (single stream) collection systems and tailored educational materials. To date, it has helped put 165,000 carts on the ground in communities across the U.S. and made \$11 million in grants available to improve recycling education, operations and to reduce contamination.

Grants are funded by twenty-two partners, which include mostly trade associations and industry groups that represent different material types, but also include a handful of consumer brands: Coca Cola, Heineken, Keurig Green Mountain, Kimberley Clark, and Proctor & Gamble. The initiative was initially started by the aluminum industry out of an interest in getting more access to post-consumer metal. Membership has now grown substantially to include various material end-users. Partnership President, Keefe Harrison, noted that this is due in part to a marketplace demand for secondary materials that was not there when the Partnership began.

The Partnership works primarily with communities, which it sees as representing the beginning of the reverse supply chain. While the Partnership has had major success in building coalitions and sharing lessons learned, its primary focus on community education and access to carts does not address all systemic barriers identified, like design and technology. Garth Hickle, Product Stewardship Team Leader at Minnesota Pollution Control Agency, called it an “additive but not transformative” approach. He noted that while providing carts to communities is good, this doesn’t address the larger issues around governance, finance and design.

The Partnership has however, demonstrated its ability to evolve, and many of the experts interviewed commend the Partnership for broadening its approach to address quality and contamination. The Partnership has also started to increase its engagement in recycling operations by providing technical advisory to a growing MRF network. It has collaborated with other producer initiatives like the Sustainable Packaging Coalition (SPC) and the recently formed Glass Coalition. The Recycling Partnership is an excellent example of how producers are continuing to evolve in their understanding of and involvement with recycling for their products.

The Partnership has cultivated a positive reputation which is beneficial in attracting additional membership and investment. However, the \$11 million the Partnership has made available is not a significant financial commitment from some of the world’s largest industry organizations and brands. Considering its national network of communities and growing project portfolio, however, there is plenty of opportunity for further growth and experimentation. In her interview, Keefe Harrison noted that the Partnership is, “kind of a startup.”

### ***Case Study 3: The Closed Loop Fund Fills More Gaps, Fosters Industry Investment***

The Closed Loop Fund is a relatively new, industry-led recycling initiative that acts as an investment bank for new recycling technology. The founding belief is that the problems associated with the U.S. recycling system come from underdeveloped infrastructure and a lack of access to capital for investment in new recycling technology. The Fund came into creation following a Wal-Mart supply chain summit around the same time as the NWA initiative. The Fund aims to address the technology barriers in U.S. recycling, and emphasizes the important fact that just because something is thrown in a bin doesn't mean that it gets recycled. The Fund enables leading brands to work directly with municipalities to support the development of infrastructure for recycling where it does not exist and also to invest in new technologies for hard-to-recycle materials.

The Fund’s investments focus on problem areas in recycling technology and upgrades to MRFs, trucks, and other key infrastructure. The Fund has allocated \$100 million as favorable loans with variable interest in an attempt to spearhead investments in recycling that can be replicated around the country. The first three investments have taken \$8 million from the Closed Loop Fund and created an additional \$20 million in private and public investment from partnering governments and companies. In the next 12-18 months, the Fund will allocate another \$30 million in investments, which it says will unlock another \$50 million to \$75 million in public and private capital. Two of the Fund’s initial investments focus on efficient conversion from dual to single stream recycling in rural municipalities. The Fund’s most recent and novel investment is in a one-of-a-kind Plastic Recovery Facility (PRF) in Baltimore, Maryland. This state-of-the-

art facility can both separate products and turn them back into raw materials for new products and packaging, and is double the capacity of what is presently possible in the U.S.

According to Managing Director of the Fund, Rob Kaplan, the principle driver behind this initiative is a desire for improved access to secondary materials. Founding members include Wal-Mart, Coca Cola, PepsiCo, Johnson & Johnson, Colgate-Palmolive, Proctor & Gamble, Keurig Green Mountain, Unilever, and Goldman Sachs, who were later joined by 3M and Dr. Pepper Snapple. Rob noted that each member has different interests and an individual agenda. For example, Coca Cola wants better access to recycled PET and P&G has interest in high-density polyethylene (HDPE). Colgate and Keurig have concerns over recycling rates for the difficult-to-recycle packaging that they use for their products. While membership is limited to a handful of big brands, it is not exclusive. Rob noted that he has been disappointed with some brands for not participating. Other interviews suggested that membership in the Fund appears to be “invite only.” In addition, the price tag for membership is too high for many smaller brands and industry groups with less brand exposure.

Critics say that the \$100 million dedicated to the Fund is not nearly enough to fix the U.S. recycling system. Greater investment, however, depends on demonstrated returns from current investments. After five years, the Fund will evaluate the success of its projects by looking at the impact created at the end of year three and four. At this point if investors support continuation, the Fund will continue to expand. The underlying philosophy that loans will be repaid from the success of the investment means that there is a high level of rigor applied in approving and monitoring projects. Four criterion must be met for project approval: 1) It has to be financially viable with a clear line of site to repayment; 2) It must result in a significant amount of tonnage diverted; 3) It must be reportable and measurable; 4) It must be scalable and replicable. This approach ensures that the investments made are carefully selected for their economic potential.

Experts agree that investment in new technology is critically needed. Garth Hickle of the Minnesota Pollution Control Agency noted that outside of some places, there is a real lack of financial ability to make such investments. Susan Robinson of Waste Management says that projects like the PRF help develop solutions for material that no one else is focusing on, such as plastic films. The creation of PRFs is also a key recommendation in a new study by the Ellen MacArthur Foundation, “The New Plastics Economy” (The World Economic Forum et al, 2016). The Fund’s model helps make these ideas a reality by providing seed money for these projects which in turn drives technological innovation. The Fund’s company investors agree to take on greater risks than typical investors, which makes the Fund a form of impact investment.

The Fund is unique for its focus on needed technological improvements and innovation in recycling systems, but the initiative does not address issues with design or issues of policy or recycling contracts. Although Rob noted that design is a big part of a working system, it is not a key focus of the Fund’s work. On policy, he noted that every investment the Fund makes is within a policy framework and that there is a need to better understand this. The Fund is actively exploring opportunities for knowledge sharing and collaboration with the Recycling Partnership and wants to collect data on supportive policy tools. The Fund is also considering the possibility of investing in other problematic areas, such as organic waste, which is a major source of contamination. Therefore, the Fund may expand its scope to address additional recycling barriers. In his interview, Rob noted enthusiastically that “we have only opportunity in front of us.”

## ANALYZING PROSPECTS FOR INDUSTRY-LED RECYCLING INITIATIVES

These initiatives demonstrate how some producers are beginning to acknowledge a level of responsibility for their EoL products and a willingness to take on some of the costs. This change in attitude arises in part from bottom line interests: consumer demand for more sustainable products and recycled content; hedging against costly legislation; and risk avoidance through increased access to recycled material feedstock that is less susceptible to virgin commodity price fluctuations. Keefe Harrison noted in her interview the importance of making the business case by looking at recycling as a way to get feedstock for manufacturing, rather than as a landfill diversion tactic or saving trees. Tim Brown also stressed the importance of looking at this issue as extracting value as opposed to eliminating waste.

While it may be possible to use 100% recycled material in products and packaging, the pace at which we get there is dependent on multiple factors: how people use and dispose of the material, technology that enables it, and the policies and economic context that enable recycling to be cost effective. In the three producer initiatives analyzed, only the Nwana EPR initiative considered all of these factors and addressed all of the identified system barriers.

**Figure 2:** How Producer Initiatives Address Recycling System Barriers

	Improves Access to Recycling Collection	Addresses Contamination of Recycled Content	Improves Recycling Technology	Promotes Policies/Contracts that Support After-Markets	Promotes Packaging Design that Considers EoL
Closed Loop Fund	X		X		
Recycling Partnership	X	X			
NWNA	X	X	X	X	X

The Nwana EPR initiative aimed to fundamentally shift the responsibility for packaging recycling to producers and, in theory, addressed all of the system barriers identified. The fees paid by producers cover the cost of the recycling system and would help to finance improved access to and technological investments in recycling. Management of the system by material end-users could also help improve the focus on material quality. The EPR policy's variable fees for different products provide financial incentives for EoL-conscious design which in turn supports commodity-like collection contracts. Unlike the other producer initiatives, EPR is a policy tool which means that it is legally enforceable.

In practice, however, the effectiveness of EPR is highly dependent on the structure of the program. A fully producer-led EPR model for packaging, where producers both manage and pay for recycling, is unlikely to get needed support by municipalities or environmental advocates. Shared responsibility models, where producers and municipalities share management responsibilities, vary in their effectiveness. A federal EPR bill is unlikely and so such an EPR system would likely be inconsistently implemented across different states. However, state legislation would allow for consistency across municipalities within states. For more information on different kinds of EPR models, see Appendix C.

The Closed Loop Fund and Recycling Partnership are currently being implemented and serve as important ongoing experiments. Neither of these initiatives alone addresses all of the system barriers identified, which demonstrates the still incomplete view that most producers have of the U.S. recycling system. Combined however, they are more effective at addressing barriers. In addition, industry-led voluntary initiatives can harmonize efforts across political jurisdictions, whereas state policies cannot. By examining these initiatives, it is clear that policy research and advocacy as well as consideration for EoL design are still critical missing elements in ongoing producer initiatives

## **KEY RECOMMENDATIONS**

### **Producer initiatives should align data and reporting and collaborate on projects.**

In order to maximize impact on the U.S. recycling system and better appease policymakers and consumers, there is a need for more strategic cooperation between producer initiatives. The Recycling Partnership and Closed Loop Fund are natural complements that each offer different tools to catalyze structural change. These initiatives do not face the same level of tensions between material-user groups as the NRNA initiative did, nor are they as unilateral. They therefore offer promise for improving coordination between different producer players across and within industries. Both Keefe Harrison and Rob Kaplan acknowledge that there is opportunity for further coordination of their efforts.

In the short term, the Partnership should use its network of cities to help the Fund target and connect with localities for its access projects and also provide guidance on best practices for funding applications. The Fund can serve in an advisory capacity for the Partnership's growing technical guidance services to MRFs and share feedback that it receives from the recycling industry as it develops its own best practices for technical projects. These initiatives should also harmonize their efforts as much as possible with the work of other existing producer initiatives, in particular the Sustainable Packaging Coalition (SPC), a project of the nonprofit organization GreenBlue.

It is critical for these initiatives to jointly align their work around policy goals. If the initiatives could jointly report the effectiveness of their efforts in increasing recovery rates under different policy scenarios, they would have a more input in influencing good policy that supports material end-users. To this end, the initiatives should develop compatible reporting metrics that allow them to quantify and track how different projects improve recovery rates for their products. In the longer term, the Fund and the Partnership should consider directly partnering in larger recycling improvement projects, acting as joint contractors for cities, states and industry, which would require some harmonization of their financing in addition to reporting efforts. The Fund's loan-based financing mechanism will result in good data on return on investment for various recycling technologies, which should then directly inform what projects the Partnership deploys and which projects the groups should cooperatively support.

### **Producer initiatives should help develop and advocate for industry design standards.**

There is an obvious lack of awareness on the producer side about the important role of design, with much more attention given to end-of-pipe solutions. Nina Goodrich, Director of the SPC, stated that,

“design and sourcing are pretty underrepresented with the exception of recycled content. Brands want more recycled content, but in order to get it, the packaging has to first be recyclable.” Brands ultimately have control over packaging design decisions and for this reason, design is the easiest barrier for producers to influence in an otherwise very complex system of material flows with multiple players. Many of these design changes involve very simple solutions, such as making labels easily removable. Currently, however, there are not enough drivers in the packaging industry to support major EoL design innovation at scale. As high profile producer initiatives, the Closed Loop Fund and Recycling Partnership should partner with the SPC to develop and disseminate industry design standards, which their members must agree to adopt. These companies should also lead the fight for good design through other industry associations and organizations.

### **Regulators should partner with leaders in industry to ensure that policies support recycling markets.**

Local and state governments do not typically consider recycling policy to be a tool that supports market development. Instead, policymakers often focus recycling policy efforts around collection rates due to concern over sanitation or meeting legislative requirements, but do not focus on other market barriers. Producers therefore have an important role to play in market development by advocating for policies that best enable getting post-consumer material back. This was the case with EPR when NRNA took on such an advocacy role. While some brands are still open to exploring EPR however, most remain resistant (MacKerron and Hoover, 2015). Similar to EPR, the most effective policies should reflect the value in recycled commodities and allow consumers and producers to see the real costs of handling less valuable materials. New frameworks are needed, such as the “Sustainable Materials Management” model that is currently implemented in Oregon and California. This framework goes beyond recycling goals and emphasizes a holistic, life-cycle approach to using and reusing materials more productively, from the point of material extraction to products at end-of-life.<sup>7</sup> These kinds of policy frameworks are helping to shift the evaluation lens from what goes in the bin to what comes out. Policymakers should help these initiatives to actively gather data on how effective their projects are in the different policy contexts they operate in, including communities that have composting or waste-to-energy policies.

### **The recycling industry must innovate new business models that help producers develop markets.**

Recyclers are key partners for producers and can help develop markets for post-consumer material. Recycling companies can influence the communities they work in with contracts that recognize the changing waste stream and future markets. To this end however, they must be more willing to challenge their industry’s conventional business model and build bridges with producer end users. Current producer initiatives would increase the scale of their impacts by working more closely with recyclers at a strategic, regional level, since recycling barriers typically follow larger, regional trends (Haaren et al, 2010). There are some players in the waste industry that recognize the opportunity to become “material managers” as opposed to waste haulers, such as Casella. However, for the most part, innovation in the industry is scant and as a result, there is a lack of trust between large waste management companies and producers in the U.S. Both producer initiatives and the recycling industry should better engage entrepreneurs by inviting business proposals for new, disruptive ideas where they can act as investors or partners.

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<sup>7</sup> Sustainable Materials Management (SMM) emphasizes exploring new opportunities to reduce environmental impacts, conserve resources, and reduce costs in a way that encourages flexibility and thriving secondary markets, and encourages innovative new management ideas like waste-shed (like watershed) area-based recycling systems (EPA, 2015).

## CONCLUSION

The business case for fixing the struggling U.S. recycling system has been pioneered by companies like Nestle Waters NA and continues to grow through ongoing producer initiatives like the Recycling Partnership and Closed Loop Fund. Producers agree that improved access to recycled material would enable them to respond to consumer demand for more sustainable products, help them manage supply chain sourcing risks, and position them to take advantage of new business opportunities supported by a more circular economy. Packaging plays a key role in this journey, as it comprises a large part of the waste stream and has been given increasing attention by policymakers in the U.S.

The producer-led initiatives highlighted in this research demonstrate the increased role that brands are taking on in product stewardship as well as a growing understanding of the recycling system that supports their products. Whereas traditional producer efforts have focused narrowly on consumer education, these current producer efforts now also consider access, contamination, and gaps in technology, three of the five key recycling system barriers identified in this research. Current producer initiatives do not do enough to incentivize smart packaging design that considers EoL. They also fall short of advancing good policy that supports aftermarkets.

Moving forward, producer initiatives should be more strategically aligned and collaborative in order to scale their impact. These voluntary initiatives are currently comprised of just a handful of companies. The more companies that join in these efforts, the more effective they will be. In the presence of many free rider brands however, these producers cannot and will not take on the entire cost of recycling system reform.<sup>8</sup> Regulation is therefore necessary to help correct for market failures, and producers and governments alike must advocate for good policy that supports the development of recycling markets. Recyclers need to take on a more leading role, working as key partners and fellow entrepreneurs.

Most companies and governments still think of environmental projects as a cost. When sustainability and economic opportunity align is when real change begins to happen. Investing in the recycling system that supports product packaging is one way that companies are starting to recognize the importance of sustainability in their value chain. Despite the shortcomings of producer efforts, participating companies should be commended for taking on active roles as system architects rather than just system beneficiaries. The initiatives explored in this research have demonstrated that producer initiatives can evolve. The question now becomes whether they will evolve fast and good enough to avoid undesirable regulations, or even better, support the right regulations that serve the interests of both the environment and market development for secondary materials.

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<sup>8</sup> This notion of “free riders” has been a major factor behind unsuccessful industry-led initiatives. While policy solutions set up compliance systems that discourages free riders, market driven solutions will inevitably involve disproportionate risks taken on by leaders as the result of unbalanced incentives, resulting in free riders.



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## **APPENDIX**

## Appendix A: Summary of Recycling Issues by Packaging Material Type

Material value is a fundamental driver behind material flows in recycling system, where materials with higher value tend to have more developed secondary markets which leads to higher recovery rates. High recycling rates for some materials masks low recycling rates across other materials. With the exception of corrugated boxes and steel packaging, not a single other category of packaging has recycling rates above 55% in the United States. While the overall recycling rate for packaging is about 50%, removing corrugated boxes and steel, the overall rate drops to 30%.

### Paper

- Paper packaging represents the largest category of packaging by weight as well as market share. As mentioned previously, corrugated board has high recycling rates of 89%. However, other types of paper packaging have an average recycling rate of only 27.7%, with cartons at a mere 6.5% and wrapping papers at less than .05% in the most recently available EPA data. Multi-material forms of paper packaging are on the rise, such as aseptic cartons, which combine paper with plastic, pigments, inks and adhesives, and are difficult to separate at end of life (EoL) and have little economic use in aftermarkets.
- The paper industry largely doesn't consider recycling to be a high priority issue since recovery rates are so high for corrugated board. According to Tom Szaky, companies that use other forms of paper packaging have not been pioneers in developing secondary markets for their materials as there is less value in these items and therefore less vested interest in getting them back. For example, Starbucks had committed to making its paper cups recyclable only to find out they were simply not economical to recycle and subsequently dropped their initiative.

### Plastic

- Plastic packaging is the second largest packaging category both in terms of weight and market share, at 30% of total sales (WPO, 2008). This is the fastest growing portion of the packaging recycling stream, as plastics are a cheaper material that is lighter to transport than other materials. The increase in plastic is a defining feature of what has come to be known as the “evolving ton”, where plastic is increasing as a percentage of the total waste stream and traditional materials like paper are decreasing.
- Although it makes up a large portion of packaging, plastic has the lowest recovery rate of any material type, currently at only 14.6%.<sup>9</sup> Recovery rates again vary tremendously by material category. Polyethylene terephthalate (PET) bottles have the highest recovery rates in this category at around 31%, followed by High Density Polyethylene (HDPE) bottles at 29%. These two plastics also have the highest market value, together comprising 86% of market share (Embree, 2016). Other plastics (#3-7 resins) are mixed and baled together. These plastics have much less value and significantly lower recovery rates. The U.S. has not invested much in recycling technology for #3-7 plastics, instead sending most of these to China for recovery (CalRecycle, 2014). China's Green

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<sup>9</sup> A study by *As You Sow* pointed out that even less plastic packaging is collected than is estimated by the EPA, as the agency does not track the fast-growing category of multi-laminate plastic packaging (e.g., pouches and sacks), which is replacing more recyclable forms of packaging (MacKerron, 2015).

Fence Policy has led to a drop in plastic exports and an increase in the amount of plastic material sent to U.S. landfills.<sup>10</sup>

- Those plastics that remain in the U.S. are often not collected or are collected but not successfully recycled. Currently, 70% of communities across the U.S. are not able to collect and recycle #3-#7 plastics. Globally, these plastics often end up in landfills, incinerated in Waste to Energy (WtE) Facilities, which are less common in the United States, or left as unmanaged waste where leakage can occur to waterways and eventually the ocean.
- Even when these materials are collected, the light-weighted and varied forms that plastic can take leads to confusion at many Material Recovery Facilities (MRFs), resulting in losses of these materials to paper and residual streams while they are being processed. This explains some of the losses that occur after collection. Flexible and film plastic presents a particular challenge in this area and have been given special attention by producer initiatives like the Closed Loop Fund.
- In addition, recyclers may reject loads if they are undesirable. Manufacturers have been very successful in reducing the weight of packaging by using less material. While this source reduction has many upstream benefits, it also means that containers take up the same amount of space but offer less resale value to recyclers, leading to higher processing costs for recyclers who now have to push much larger volumes of waste through their facilities to yield each one-ton bale of raw material. According to Tom Szaky, many recyclers don't accept materials that are too thin.
- Plastic pollution has been a visible problem since plastic started getting widely used in the 1960s and recent public outcry over marine debris as well as new research has resulted in a resurgence of the importance of this issue. The U.S. is the only OECD country listed in the top twenty countries contributing to marine debris in the world's oceans (Jambeck, 2015). The Ocean Conservancy recently released a report that itemizes marine debris content and found that the majority of items are some kind of plastic packaging (The Ocean Conservancy, 2015).
- Some companies, namely bottled beverage companies, see plastic pollution as a high priority environmental issue. Bottled beverages typically rely on higher value plastics, and so these companies have additional vested interest in getting material back for reuse.

## **Metal**

- Metal packaging is comprised of both steel and aluminum packaging, both of which are highly valuable materials that are widely recyclable and do not deteriorate in quality after being recycled. Steel has high recovery rates of 72.5%, while aluminum ranges from 55% for cans to 10% for foils and closures (EPA, 2015). Losses of these materials represent a major loss in value as well as a loss in the embodied energy that is needed to extract new virgin materials from metal mines.
- Because metal packaging has been used in consumer product packaging for many decades, it is largely accepted by municipal systems and the majority of losses therefore occur at the point of collection, where cans are not successfully collected for recycling or lose value from consumer behavior, such as crushing cans. Some losses also come from the increased use of mixed materials in the evolving ton, such as aluminum foils that are used in layers in aseptic and flexible packaging, which are very difficult to separate at EoL.

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<sup>10</sup> The U.S. exports paper and metals to China in addition to plastics, however plastics exports have been most impacted by the Green Fence Policy due to their lower value and higher contamination. Some more valuable plastics have seen a resurgence in exports in the years following the Green Fence, however lower value plastics have seen a decrease in exports of up to 30% according to data from CalRecycle.

- Companies and industry associations representing metal packaging have demonstrated vested interest in increasing recycling rates for their products and getting these materials back. Novelis, for example, invested heavily in recycled content efforts and created the evercan™ made with 90% recycled content. However, markets have not been able to supply sufficient recovered material to continue these efforts.

## **Glass**

- Glass packaging, like metal, is infinitely recyclable and widely accepted in municipal recycling programs. Its recovery rates range from 14-41%, with beer and soft drink bottles having the highest recovery rates followed by wine and liquor bottles. Other bottles and jars only have a 14.8% recovery rate (EPA, 2015).
- The main points of loss for glass involve breakage that occurs post-consumer use or at MRFs, which is also a significant source of contamination for other recyclable streams. Broken glass pushes up processing costs for recyclers and degrades the quality and re-sale value of bales in single stream systems. There is much evidence to support that separate collection of glass is a favorable economic arrangement.
- Glass packaging users do not have the same external consumer pressure to use recycled content as plastic packaging, and although glass packaging does have some aftermarket value, it does not have value-driven incentives on par with metal packaging. Producer interest in recycled content is therefore limited. Katie Wallace of New Belgium Brewing noted that producers that use glass are interested in reducing breakage and contamination that comes from their products and also are interested in reducing greenhouse gas emissions, since glass is very heavy to transport and serves as a major source of emissions for material users.
- The glass industry has traditionally supported container deposit legislation that enables higher recovery rates of glass bottles. However, these laws are often opposed by users of other materials.

The different materials used in packaging each have different economic value, environmental impact, and aftermarkets. These distinctions change the set of incentives that different producers are working with and have historically led to conflicts of interest between different material industries and end users. These differences are exacerbated in comingled recycling systems where the fates of these materials are intertwined. While the metal packaging industries and some plastics and paper are driven by an interest in getting material back for reuse, glass, non-corrugated paperboard users and less valuable plastics users are not.

Insufficient collection is a leakage point shared across material types. Contamination of the waste stream is also an issue shared across material types, caused primarily by broken glass, non-recyclable and mixed materials, and other contamination like organic waste. Glass is seen largely as a problem area, whereas plastics are seen as both a problem and an opportunity area, as detailed in the Ellen MacArthur Foundations recent study, ‘The New Plastics Economy’ (World Economic Forum et al, 2016). However, plastics and mixed material packaging lack sufficient afterlife processing technology and suffer losses at MRFs.

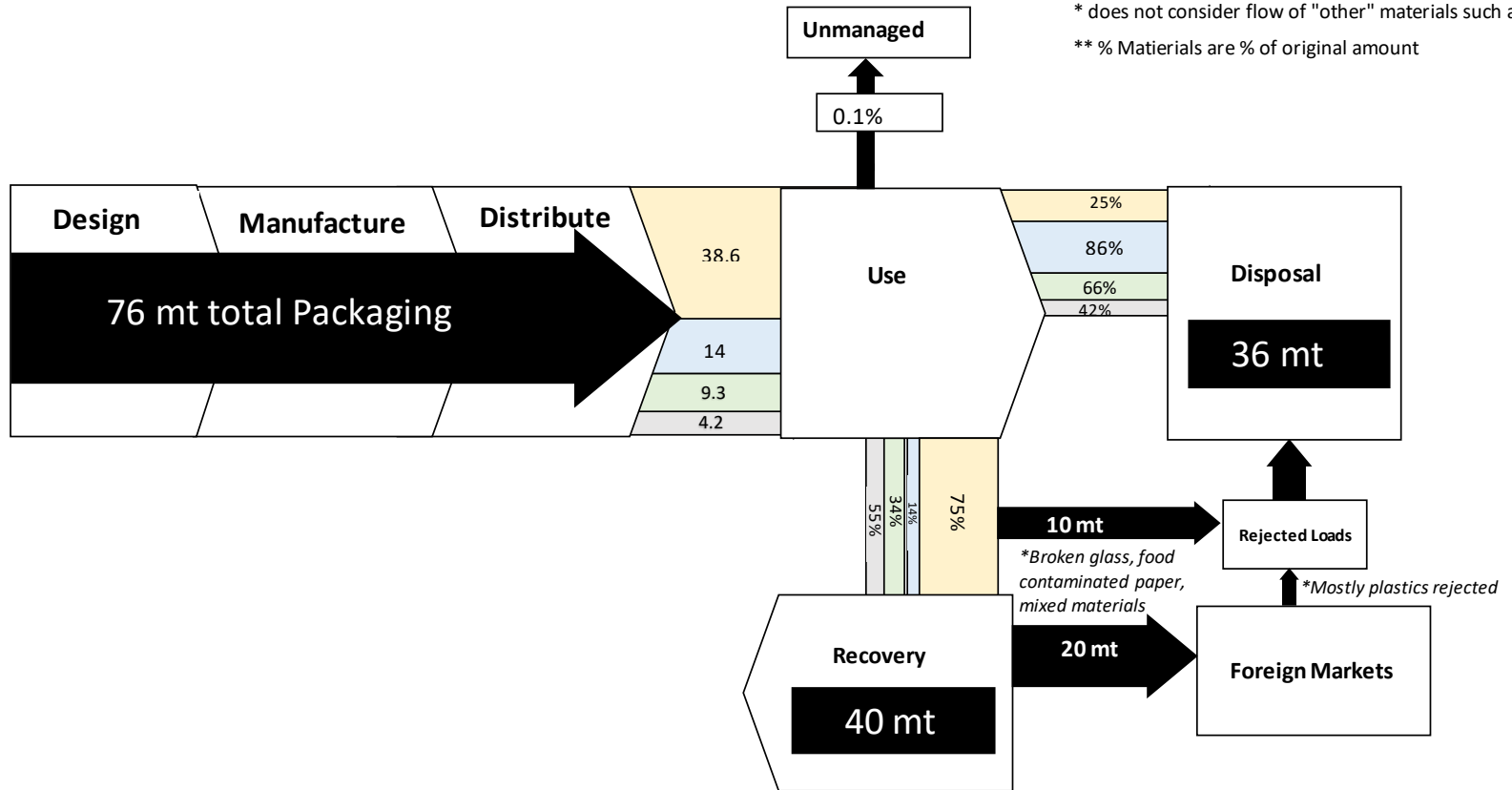


# USA Packaging Material Flow (by weight)

Mt= million tons  
 Current flows using 2013 packaging data

Total	
Paper	
Plastic	
Glass	
Metal	
Other	

\* does not consider flow of "other" materials such as w  
 \*\* % Materials are % of original amount



## Appendix B: Summary of Relevant Policy Tools

Globally, most solutions for problematic packaging waste are driven by regulation, and in most countries, government is involved in waste management as a regulator and as a service provider. Typically, national or sub-national (state or provincial) governments act as regulators, whereas it is local governments that are assigned operational responsibility for waste management. Recycling in the U.S. follows a similar structure, however national-level regulation of nonhazardous waste is limited. The Resource Conservation and Recovery Act (RCRA) delegates the primary responsibility for recycling to individual states. States must adhere to the standards set out by RCRA and in addition can implement additional laws as they see fit. States delegate responsibility to local governments for solid waste, recycling and composting management in their communities. Cities can also create additional local laws on recycling. As such, policies in addition to management of recycling in the U.S. are disaggregated and occur largely at the state and local level. This makes the U.S. distinct from many other places.

According to Susan Robinson of Waste Management, the U.S. has a different way of doing things and very different drivers than the rest of the world. These include for example, low use of Waste-to-Energy (WtE) and large amounts of land and low landfill fees. Rates charged for recycling are often built into community waste management programs. A federal directive for packaging waste, as is in place across Europe, is unlikely.<sup>11</sup> Tom Szaky of Terracycle noted in his interview that culturally, the E.U. region is more resource concerned, a reflection of its dense area and as the site of two world wars. This concern is reflected in national and supranational legislation, but that won't happen in the U.S., as there is a very different appetite for policy and the baseline way that industry feels about it. While recycling rates vary by country in Europe, the overall recovery rate for packaging is 67.8%, notably higher than in the U.S.<sup>12</sup> Problematic materials like plastics are recovered at rates of twice or more than in the U.S. Europe is therefore an example of how policy-based initiatives can increase packaging recovery.

Most policy-based solutions, often called “command and control” solutions, address a variety of economic, environmental and social concerns which can take the form of either reward or punishment (i.e. the carrot or the stick). Existing programs at the state and local level are comprised principally of recycling goals, landfill bans for recyclables, material bans, pay-as-you-throw (PAYT) or variable pricing, and producer responsibility laws in the form of container deposit legislation. Producer responsibility laws also include Extended Producer Responsibility (EPR) laws, which are in place in every other developed country for packaging except the U.S. but is currently being actively discussed in several states.

Looking at the various policy approaches in terms of promoting the circular economy for packaging, it is important to consider not only recycling rates, but also keeping quality, valuable material in circulation for continued commercial use. In order to achieve this, policy tools must address and correct for the barriers identified: 1) Access to Recycling Collection; 2) Contamination of Recycled Content; 3) Insufficient Recycling Technology; 4) Policies/Contracts that support after-markets; 5) Packaging Design that Considers EoL.

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<sup>11</sup> [Directive 94/62/EC](#) on Packaging and Packaging Waste established EPR for packaging across the EU and harmonizes national measures and to promote a balanced recycling market across Member States.

<sup>12</sup> Statistic for EU 15 countries in 2013 for packaging, from <http://appsso.eurostat.ec.europa.eu/nui/show.do>

**Table 1:** Comparison of Policy Initiatives in Addressing Systemic Barriers

Policy	Improves Access to Recycling Collection	Addresses Contamination of Recycled Content	Improves Recycling Technology	Promotes Policies/Contracts that support after-markets	Promotes Packaging Design that Considers EoL
Recycling Goals	X				
Landfill Bans	X			x	
Material Restrictions/Bans		x			x
PAYT	X				
Container Deposit	X	x	x	x	x
EPR	X	x	x	x	x

- **Recycling Goals** include recycling percentage targets as well as mandatory recycling for certain materials in a given jurisdiction. These are an end as opposed to a means and their effectiveness in addressing the key barriers depends on the joint use of enforcement mechanisms and other programs in place to be effective in achieving a state or city wide goal.<sup>13</sup> To have a recycling goal in place however requires at a minimum access to collection services.
- **Landfill bans** for recyclable materials promote keeping valuable materials in the system by prohibiting their disposal in landfills and in this way they support aftermarkets. Recyclers must comply with these bans, which realigns distorted incentives to landfill. However, bans can be hard to police and their effectiveness is unclear (Carton Council, 2014). Some research on landfill bans for electronic waste (e-waste) in the United State have been largely unsuccessful (American Chemical Society, 2013). These policies do not address access to recycling services or contamination.<sup>14</sup>
- **Material restrictions or bans** in states and localities prohibit problematic materials altogether or impose other restrictions or specifications such as recycled content requirements. As opposed to landfill bans, material use bans and restrictions focus on preventing less valuable materials from clogging the system as opposed to keeping valuable materials in the system. By keeping problematic materials out of the waste stream, this deals with some contamination issues and consumer confusion on certain materials. This in turn can incentivize design that uses unproblematic materials. However, these policies don't contribute to access.<sup>15</sup> There have been mixed reports of effectiveness from these strategies. The city of Austin reports for example that their plastic bag ban reduced the amount of single use plastic bags both in count and by weight,

<sup>13</sup> States exploring or that have implemented statewide recycling goals include: California, Delaware, Florida, Maine, Maryland, Massachusetts, Minnesota, Pennsylvania, Texas, Virginia and Washington (Carton Council, 2014).

<sup>14</sup> Massachusetts, North Carolina, Vermont and Wisconsin. Some cities, such as Seattle, have city-wide bans (Carton Council, 2014).

<sup>15</sup> At the federal level, plastic microbeads have been banned in the U.S. California and New York City have banned single use Expanded Polystyrene Loose-Fill Packaging. California, multiple counties in Hawaii, and Washington D.C. prohibit single-use plastic bags in retail stores. New York and Delaware have restrictions on plastic bags. California also has material restrictions in place for Rigid Plastic Packaging Containers (Carton Council, 2014).

however other bags were used in their place that had higher carbon footprints and increase in costs (Austin Resource Recovery, 2015).

- ***Pay as You Throw (PAYT)*** programs or variable-rate pricing programs shift recycling costs towards consumers by charging households for waste disposal according to their trash volume. Traditionally, residents pay for waste collection through property taxes or a fixed fee, regardless of how much trash they generate. Under PAYT, residents are charged a fee for each bag or the weight of waste they generate. Recycling fees are either not charged or they are charged at a lower fee than waste collection, creating an economic incentive to recycle. The U.S. EPA estimates that approximately 7,100 communities in the United States use some kind of PAYT, making it available to approximately 25 percent of the country's population, with the number of communities rising over time. Industry organizations largely support this policy approach. A study by AMERIPEN concluded that PAYT programs are broadly appealing and can be used in nearly any situation and do not require changes to a community's collection method (AMERIPEN, 2013). According to the EPA, communities that use PAYT recycle 30 to 40 percent more than the rest of the country. It has been noted that PAYT is most feasible where governments can measure and monitor individual households' weekly trash and recycling. While PAYT programs address consumer behavior and support access, they do not address issues related to design of products to encourage recovery or contamination of recyclables.<sup>16</sup>
- ***Producer responsibility*** policies are a way to mandate product stewardship, where producers are made responsible for their products post-consumer use, at End-of-Life (EoL). This is another form of cost shifting like PAYT, but instead toward the producers that put materials on the market and have influence upstream. These policies are essentially funding mechanisms.
- ***Container deposit laws*** require refundable deposits on beverage containers in order to ensure a high rate of recycling or reuse and help combat litter from beverage containers, which have historically contributed to a large percentage of litter. These policies incentivize the return of valuable materials and addresses contamination. Deposit fees are used towards funding recycling systems including collection and technology upgrades.<sup>17</sup> According to the Container Recycling Institute, states with bottle bills have a beverage container recycling rate of around 60%, while non-deposit states only reach about 24%. While bottle bills are comprehensive in barriers addressed, they only apply to a narrow category of products.<sup>18</sup> Many states are currently considering reforming their bottle bills to reduce costs and apply to more materials.

EPR extends the scope of producer responsibility across packaging products, with variable fees based on materials, which builds in incentives for design that considers EoL. EPR represents the most systemically focused policy option, as these policies aim to fundamentally shift responsibility for packaging recycling to the private sector. EPR programs are well-known to reduce waste associated with consumer

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<sup>16</sup> Some states (Wisconsin, Oregon and Minnesota) have a law requiring that communities use PAYT.

<sup>17</sup> This is in an ideal case, one major criticism of bottle bills by producers in the U.S. is that municipalities and states that administer these programs use the fees to fill other budget gaps rather than investing in recycling system upgrades.

<sup>18</sup> Ten states have container deposit laws: California, Hawaii, Oregon, Connecticut, Delaware, Maine, Vermont, Massachusetts, Iowa, Michigan and New York.

products and have documented increases in recycling have occurred in all countries which have implemented it (Stolaroff, 2009). In reality, there are many models for EPR and the effectiveness and support of these policies is highly dependent on the model and structure of the program. The U.S. is the only industrialized country without EPR for packaging. However, the past 5 years have seen an increasing number of states start conversations on EPR for packaging and printed paper (PPP).

A study recently published in Resource Recycling tracked state-level recycling legislation and highlighted recycling goals, product stewardship laws and diversion and ban laws for plastics as key areas of activity in the U.S. Plastics accounted for 18 percent of all materials diversion-related bills introduced at the state level in 2015, particularly for plastic bags, expanded polystyrene and plastic microbeads. Under product stewardship, the study noted that EPR for packaging and printed paper (PPP) was a notable topic in their legislative tracking, with a handful of state-level bills were introduced, demonstrating legislators’ increasing openness to EPR possibilities (Leif and Himes, 2015).

**Table 2:** Key Areas of Policy Activity, Adapted from Leif and Himes, 2015

<i>Legislative Category</i>	<i>Number of bills introduced nationwide</i>
Plastics	68
Product Stewardship	42
Beverage container deposit	20

Current, salient state policy product stewardship initiatives for packaging are further laid out in Table 3 below. These do not represent all conversations had on relevant and novel regulations for packaging, but rather serve to summarize the nature of the evolving discussion over the past year in the U.S.

**Table 3:** List of Current Product Stewardship Policy Initiatives in the United States<sup>19</sup>

State	Details
California	<ul style="list-style-type: none"> <li>- CA recently issued a statewide policy goal of not less than 75% of solid waste generated be source reduced, recycled, or composted by the year 2020. CalRecycle estimates that packaging represents about 1/4th of the state’s disposal stream and therefore its reduction and / or recovery play an important role in helping to achieve this goal.</li> <li>- EPR for packaging waste and bottle bill reform are being explicitly considered as part of this goal and other policies are also being explored.</li> <li>- CalRecycle issued a “Manufacturers’ Challenge” to explore voluntary approaches, however industry noted that their efforts are unlikely to meet a 50% diversion target in 5 years’ time. CalRecycle has noted preference for a mandatory approach.</li> <li>- CA had previously implemented multiple material bans/restrictions and container deposit laws <i>(Personal communication with Cynthia Dunne of CalRecycle, 2016)</i></li> </ul>
Connecticut	<ul style="list-style-type: none"> <li>- CT Department of Energy and Environmental Protection (DEEP) is currently in the process of researching different aspects and models of stewardship and EPR for packaging and printed paper. DEEP is collecting data that they could use for proposal to legislature, working closely with the Product Stewardship Institute (PSI). They are exploring a producer financed and managed system with performance targets by material.</li> <li>- Getting glass out of the waste stream is a priority in CT and they are also considering an extended bottle bill to include wine and liquor bottles, and focusing efforts to increase the recovery value of glass in single stream collection.</li> </ul>

<sup>19</sup> In addition to the initiatives laid out in Table 3, Maine, North Carolina, Delaware and Iowa have also considered EPR for PPP over the last several years. Delaware and other states are also considering bottle bill reform.

	<i>(Personal communication with Sherill Baldwin of CT DEEP, 2016)</i>
Indiana	<ul style="list-style-type: none"> <li>- IN introduced an EPR bill for PPP that would require producers of waste packaging and printed paper to fund and manage the proper disposal of their products.</li> <li>- The bill also establishes two state recycling goals: 1) recycling 50% of all household packaging and printed paper by July 1, 2022, and 2) recycling 60% of all household packaging and printed paper by July 1, 2025. <i>(PSI, 2016)</i></li> </ul>
Massachusetts	<ul style="list-style-type: none"> <li>- MA introduced an EPR bill for packaging in 2015 and is researching and proposing EPR action for a variety of items including packaging. If passed, this would be implemented starting January 2017.</li> <li>- MA already had a landfill ban in place for recyclables. <i>(PSI, 2016)</i></li> </ul>
Minnesota	<ul style="list-style-type: none"> <li>- MN has not yet proposed legislation, however MN Pollution Control Agency has developed a draft EPR bill in the state and is working with Upstream to clarify municipal government roles. This includes a multi-stakeholder authority and fee and reimbursement model.</li> <li>- Minnesota has a history of exploring EPR and is currently revisiting the possibility. Minnesota was chosen as the case study by Recycling Reinvented, which proposed an industry-led EPR system. <i>(Personal communication with Garth Hickle of MN Pollution Control Agency, 2016)</i></li> </ul>
Rhode Island	<ul style="list-style-type: none"> <li>- RI introduced an EPR bill for packaging in February 2016, which proposes EPR for printed paper and packaging (PPP) in order to raise PPP recycling rate in Rhode Island from 39 to 75% in two years.</li> <li>- Incentives: Rhode Island has an incineration ban and is running low on landfill space.</li> <li>- In addition, RI has a relatively centralized waste governance for the U.S. with Rhode Island Resource Recovery Corp., a quasi-public body, operating the state's only MRF and a landfill.</li> <li>- Rhode Island has been working with Upstream looking closely at British Columbia's producer run EPR model (see Appendix).</li> <li>- RI legislators tried unsuccessfully to get EPR legislation passed last year under the Marine Debris Reduction Act. <i>(Personal communication with Sarah Kite-Reeves of Rhode Island Resource Recovery Corporation, 2016)</i></li> </ul>
Vermont	<ul style="list-style-type: none"> <li>- Bans on the landfill disposal of mandated recyclables went into effect in 2015 as part of the universal recycling and composting law passed initially in 2012.</li> <li>- This law also authorized municipalities to impose PAYT charges for the collection of municipal solid waste. A big incentive was to explore alternatives to bottle bills.</li> <li>- EPR bills for PPP had been considered in Vermont in 2014 and the new legislation includes an assessment which still considers exploring EPR.</li> <li>- Incentives include the future closure of one of the state's two landfills as well as a desire to reform the state's bottle bill. <i>(Personal communication with Cathy Jamison of the VT Department of Environmental Conservation, 2016)</i></li> </ul>

An analysis of current initiatives shows that EPR and reforming bottle bills are getting increasing traction in the U.S. While these bills have not materialized, and many believe they will not, the trend is that more and more states seem to be considering this approach every year. As Different localities have different incentives for looking at EPR and the conversation varies considerably by state.

## **Appendix C: Different EPR Models**

EPR for packaging utilizes variable pricing by material type and involves producers in recycling, which in theory encourages the recovery and continued use of recycled material. Experts largely agree that producers are well situated to help localities collect and market materials in an increasingly global commodities market and will bring greatly needed efficiency and innovation into system (Valiante, 2015). However, states that have considered EPR for packaging are split on appropriate models, with municipalities, states and environmentalists concerned about handing over responsibility to brands.

Brands are concerned about the inefficiency and costs that would come with government-run models and don't want to hand over a blank check to governments. The first industry-run EPR model for packaging in North America launched in British Columbia in Canada, and many states and producers alike are watching this initiative closely. However, many critics say such an initiative would be unsuccessful in the U.S.

### **Shared EPR:**

Shared responsibility based EPR models respond to the fears of municipalities surrounding producer-run EPR by building in cost sharing and control among municipalities and manufacturers. Shared models are in place in the Canadian provinces of Manitoba, Ontario, and Quebec and the United Kingdom. Under this model, municipalities are typically responsible for collection and sometimes for sorting, and the division of financial responsibilities for producers varies. The EPR model currently being developed by an NGO, Upstream, is a shared responsibility model. This model is less likely to cause significant changes in collection and processing systems because those with a stake in existing infrastructure have a role in decisions. This model reflects the sentiment that local governments should have a major say in how waste is managed under EPR as they bear legal or other obligations for waste management and public health in their communities. It also reflects the notion that producers don't understand recycling market or have environmental goals at the forefront. Municipalities and environmentalists are more likely to support this model. However, producers find it undesirable since they invest in but do not control the system.

### **Full EPR model:**

This model, also referred to in some places as "Collective EPR," is producer funded and run, where brands have control over the system, ownership of material, and decision making power. The financing of recycling for qualifying products is typically managed solely by manufacturers through a Producer Responsibility Organization (PRO). The program decisions are driven by performance and cost efficiency, are flexible to changing market conditions, and provide profit-driven incentive for continuous improvement. This may drive changes in infrastructure, for example, by having transfer stations and MRFs strategically placed to maximize recycling. In the U.S. these models exist for paint and packaging. For packaging, full models are in place across Europe such as the German EPR system for packaging. In Canada, this model is only in place in British Columbia in Canada.

Companies with major interest in increasing recycling rates and building secondary markets, namely beverage companies, have been more involved in EPR conversations and tend to support producer run models. Municipal governments however fear the loss of control over the system that comes with this model, which has been a large barrier to its adoption. In addition, smaller waste haulers fear loss of market share and environmentalists fear overextending control to big brands whose incentives are not necessarily aligned with the greater good.

