



2020

State of Curbside Recycling Report



Lead Author:

Scott Mouw

Lead Researchers:

Scott Mouw, Lily Schwartz,
and Sherry Yarkosky

Contributing Researchers and Authors:

Elizabeth Biser, Ali Blandina, Joe Bontempo,
Anthony Brickner, Jackie Caserta, Sarah Dearman,
Dylan de Thomas, Allison Francis, Keefe Harrison,
Samantha Kappalman, Cody Marshall, Asami Tanimoto,
Rob Taylor, Laura Thompson, and Aditi Varma

Cover photo: Morriss Ellison from Leadpoint Business Services leads our feet on the street program in Atlanta and Auburn to help residents know more about what we they can and can't recycle.

Release date: February 13th, 2020

© The Recycling Partnership 2020

Acknowledgements

The Recycling Partnership would like to thank the hundreds of municipal and county recycling programs for the data they provided for this report through The Recycling Partnership's 2019 State of Curbside Survey, the Municipal Measurement Program, and The Recycling Partnership's West Coast Contamination Initiative research. The dedicated work of local government staff remains the foundation of the U.S. curbside recycling system.

The Recycling Partnership would also like to thank the State recycling programs, State Recycling Organizations, the Northeast Recycling Council, the Southeast Recycling Development Council, and Resource Recycling magazine for their help in distributing the 2019 State of Curbside Survey and for additional information used to complete this 2020 State of Curbside Report.

Table of Contents

Executive Summary

Introduction

Chapter 1 1

The Basic Dimensions of the
U.S. Curbside Recycling System

Chapter 2 15

Local Curbside Program Performance

Chapter 3 29

How Changing Material Values are
Affecting Local Curbside Programs

Chapter 4 37

How Community Programs Are
Reacting to New Challenges

Chapter 5 43

Helping the U.S. Curbside Recycling
System Thrive – Mapping the Path Forward

Conclusions 57

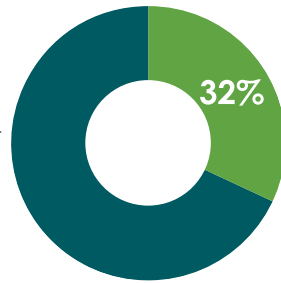
Glossary 59

Appendices 61

Executive Summary

This Recycling Partnership report is an analysis of the dimensions, performance, stresses, and opportunities for improvement to curbside recycling in the United States. The purpose of curbside recycling is to efficiently collect and deliver high quality materials from U.S. households to the circular economy – a “reverse distribution” system to gather back millions of tons of paper and packaging dispersed to millions of households for the manufacturing of new products.

Like other large scale “systems” in the U.S., such as transportation, healthcare, or electricity generation, curbside recycling encompasses many different stakeholders, approaches, and issues. In fact, it can be hard to see it as a “system” at all because of so much variation across the country. But to help curbside recycling in the U.S. take the next steps in its singular purpose of capturing an estimated 37.4 million tons of commodities to feed a circular economy, it must be viewed as a system in which the application of common, broad interventions can help it achieve its full potential.



Currently, the U.S. curbside recycling system is successfully capturing an estimated 11.9 million tons, or only about 32 percent of that 37.4 million tons. To create a higher-functioning system, three essential elements – curbside access, participation, and participant capture behavior – must receive focused attention. The good news is those elements can be addressed through smart applications of funding, best management practices, and the broadest possible stakeholder involvement.

System interventions are critical now as curbside recycling faces the most stressful time in its 30-year history. Dramatic declines in the monetary value of key materials due to dramatic shifts in the global marketplace have imposed higher costs on the local curbside programs that act as the frontline for material recovery in the U.S. This study finds that local programs now pay an average processing fee to material recovery facilities (MRFs) of \$64 per ton, with some programs absorbing fees exceeding \$100 per ton.

The economic impact of these processing charges has led a limited number of communities to eliminate curbside programs (54 programs in the U.S.), while others have reduced their material collection lists or raised recycling fees. With little relief in sight, economic pressures on local programs will continue to be a major issue in maintaining and expanding curbside recycling service in the U.S.

However, the enduring value that citizens place on curbside recycling is helping the vast majority of community programs sustain their services. In addition, as first documented in The Recycling Partnership's 2016 State of Curbside Report, data presented in this study again underscores rich opportunities to improve the efficiency of those services. Tremendous progress can be made by converting bin- or bag-based collection to cart-based collection and by converting subscription and opt in programs (when citizens need to choose and pay for curbside recycling service) to automatically provided universal service. Emerging markets, industry investments, and technological advancements also point to a future of expanded material collection.

Currently, the U.S. curbside recycling system is successfully capturing an estimated 11.9 million tons, or only about 32 percent of those 37.4 million tons.

Improved curbside recycling programs in the U.S. will deliver more quality recyclable commodities to the circular economy, but they must also address the unwanted materials in curbside containers. This study documents a first-of-its-kind national average inbound contamination rate estimate of 17 percent by weight. The Recycling Partnership calls on all U.S. curbside recycling service stakeholders to be precise and consistent in adopting the term inbound contamination to measure and specifically differentiate contaminants in collected material from residues in material recovery facilities (MRFs). By focusing on inbound materials, communities can make major strides in addressing the contamination issue using proven best management practices discussed in this report.

The ability of curbside recycling in the U.S. to deliver substantial benefits to the economy and environment will require all stakeholders to do something different than they are today. Local governments, brand companies, commodity industries, states, the federal government, and citizens themselves all own a role in transforming the U.S. curbside recycling system to its next iteration – Recycling 2.0. The “return on investment” may in some cases not be immediate, but the stakes are too high to ignore, especially as the U.S. seeks to do its part on the global issues of climate change, pollution, and the impacts of virgin material extraction. This report attempts to provide a sober assessment of where we currently stand, but also what we might achieve together through a concerted and dedicated effort.

Top 5 Perspectives on U.S. Curbside Recycling

1

More than 20 million tons of curbside recyclable materials are disposed annually. Curbside recycling in the U.S. currently recovers only 32% of available recyclables in single-family homes, leaving enormous and immediate opportunity for growth to support the economy, address climate change, and keep recyclable commodities out of landfills.

2

Only half of Americans have automatic access to curbside recycling, some who have access do not participate, and not all who participate do so fully. True access must be increased and the public can and should be engaged in improving participation and recycling behavior. All of these challenges can be successfully addressed through best management practices listed in this report.

3

Many communities are increasingly paying more to send materials to a MRF than the landfill and many programs lack critical operating funds. Helping community recycling programs improve will require addressing challenging market conditions, providing substantial funding support, and addressing inexpensive landfill tipping fees that make disposal options significantly cheaper than recycling.

4

Investing to clean up the stream benefits all sectors of the system. Contamination remains a critical issue, but it can be substantially reduced through the implementation of proven techniques across the country.

5

The ultimate fate of recyclable materials rests in the hands of a broad set of stakeholders who must all do something new and different to support a transition to a circular economy. Strong, coordinated action is needed in areas ranging from package design, capital investments, scaled adoption of best management practices, policy interventions, and consumer engagement.

Introduction

The modern U.S. curbside recycling system is now more than 30 years old. It has been a vital and consistent source of commodity feedstocks to manufacturers worldwide and it offers millions of Americans the opportunity to actively participate in protecting the environment and mitigating climate change.

The collection of curbside recyclables from millions of individual homes across America starts a chain of job creation and material utilization that enormously benefits the U.S. economy. Using the U.S. **EPA WARM model**, if all of the approximately 37.4 million tons of recyclable materials generated in single-family households in the U.S. were collected curbside and delivered back to economic use, it would generate 370,000 full-time equivalent (FTE) jobs.

These benefits are amplified by recycling's power in helping to mitigate climate change. The U.N.'s Emissions Gap Report 2019 underscores the need for urgency on all fronts in addressing the climate crisis.¹ Curbside recycling has its role to play. Again, using the WARM model, if all of the 37.4 million tons of single-family recyclables were put back to productive use instead of lost to disposal, it would reduce U.S. greenhouse gas emissions by 96 million metric tons of carbon dioxide equivalent, conserve an annual energy equivalent of 154 million barrels of oil, and achieve the equivalent of taking more than 20 million cars off U.S. highways.

Using the WARM model, if all of the 37.4 million tons of single-family recyclables were put back to productive use instead of lost to disposal, it would reduce U.S. greenhouse gas emissions by 96 million metric tons of carbon dioxide equivalent, conserve an annual energy equivalent of 154 million barrels of oil, and achieve the equivalent of taking more than 20 million cars off U.S. highways.

Currently, the U.S. curbside recycling system is probably, at best, only delivering about one third of these benefits. No one knows precisely how much because of a lack of comprehensive or consistent data at the local, state, or federal levels. As displayed in this report, The Recycling Partnership continues to dedicate substantial efforts with many stakeholders to build a better, data-based understanding of the U.S. curbside recycling system so that efforts to improve the system can be successfully benchmarked and measured.

The U.S. curbside recycling system is further hampered by disaggregated decision-making and general underperformance. Curbside programs across the country are facing significant challenges, including shifting commodity economics, stresses on taxpayer funded collection services, concerns about material quality, and a general inelasticity of collected supply to market forces. Further, the simple fact is that there is not equal access to recycling as there is to trash for many residents across the country and that an estimated \$9.8 billion in investment is needed to create a truly robust system.

Still, in many ways, the system is also resilient and well-poised to improve. Communities across the country remain committed to providing curbside services, just as Americans also continue to value and demand recycling as an essential public service.² The good news is that the application of adequate resources and smart interventions can easily improve the performance of those services.³ The Recycling Partnership's **Bridge to Circularity** report detailed steps to close the gap between future increased demand for recyclables as manufacturing feedstock and current supply, not just for plastics but for all materials. This report reinforces that call to action, providing a snapshot of the challenges facing the U.S. curbside recycling system and recommending a set of integrated strategies to help it achieve its full potential.

¹ <https://www.unenvironment.org/resources/emissions-gap-report-2019>

² <https://recyclingpartnership.org/download/30257/>

³ <https://recyclingpartnership.org/partnership-empowers-atlanta-chicago-and-denver-to-measurably-improve-recycling/>

If all of the 37.4 million tons of single-family recyclables were put back to productive use instead of lost to disposal, what would that do?



37.4 million
tons of recyclables



Reduce U.S.
greenhouse gas
emissions by

96 million

metric tons of carbon
dioxide equivalent



Conserve an annual
energy equivalent of

154 million

barrels of oil



Achieve the equivalent
of taking more than

20 million

cars off U.S. highways

370,000



full-time equivalent
(FTE) jobs

Using the WARM model, if all of the 37.4 million tons of single-family recyclables were put back to productive use instead of lost to disposal, it would reduce U.S. greenhouse gas emissions by 96 million metric tons of carbon dioxide equivalent, conserve an annual energy equivalent of 154 million barrels of oil, and achieve the equivalent of taking more than 20 million cars off U.S. highways.

Chapter



The Basic Dimensions of the U.S. Curbside Recycling System

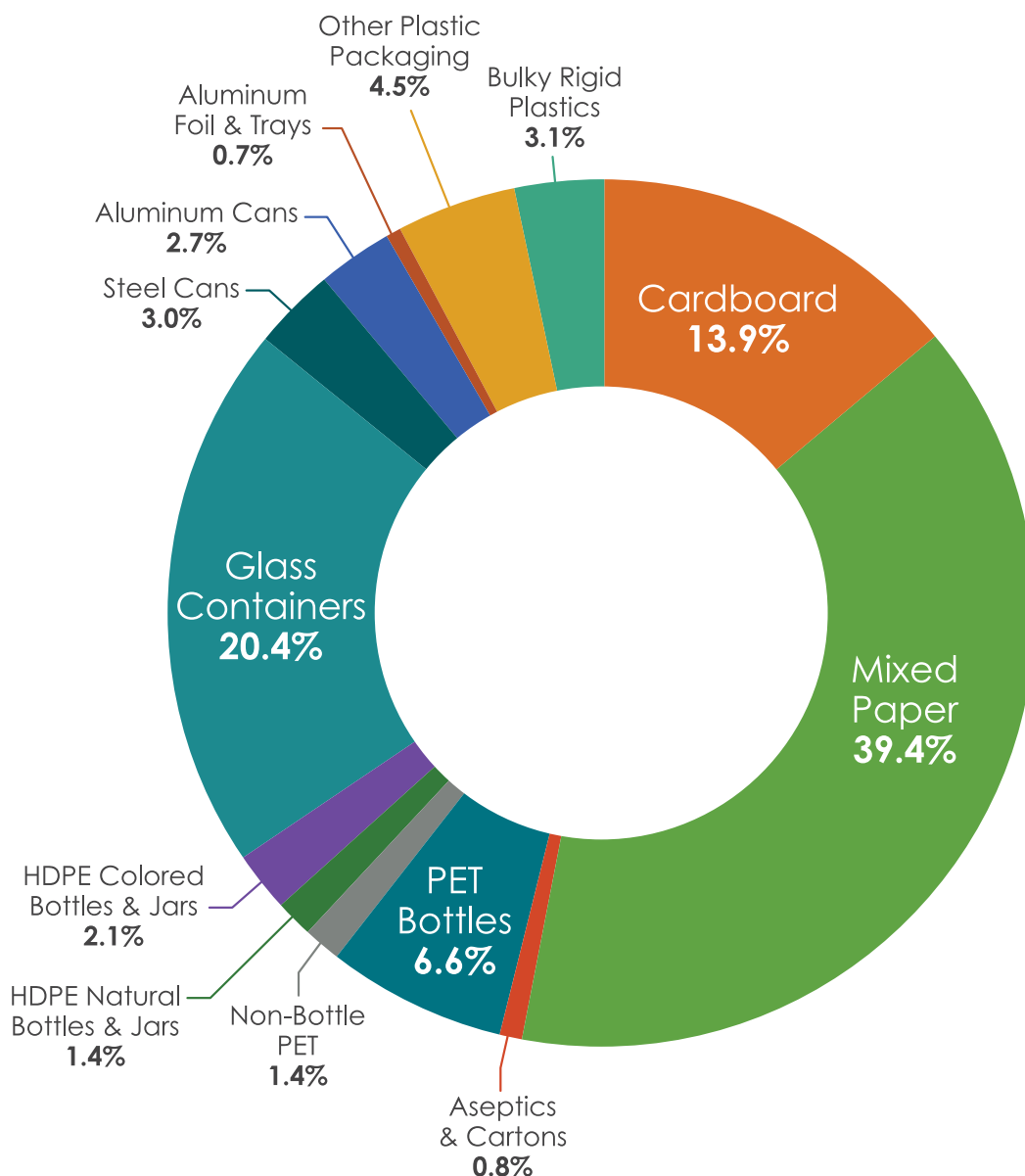
1



Curbside Material Generation

To understand how well the U.S. curbside recycling system is performing, it is important to benchmark the nature and amount of material it is designed to recover. Curbside recycling programs are designed to capture recyclable commodities primarily from single-family households.⁴ Through an analysis of waste composition, recycling, and capture study data from a size and geographic range of municipalities, The Recycling Partnership estimates that the average single-family household generates 768 pounds of recyclable material per year.

Figure 1: Estimate of Annual Curbside Recyclable Material Generation per Single-Family Household



⁴ "Single-Family household" is a common parameter of service delivery in municipal recycling programs and is generally defined as occupied housing with between 1 and 4 dwelling units. Using the U.S. Census [American Fact Finder](#) and this parameter, 2017 data finds 97,334,176 occupied single family homes (including mobile homes). The number for multifamily occupied homes is 21,008,278.

With this number in hand, it is possible to extrapolate the total tonnage of recyclable material in all single-family households in the U.S. using U.S. Census occupied housing data for single-family households.

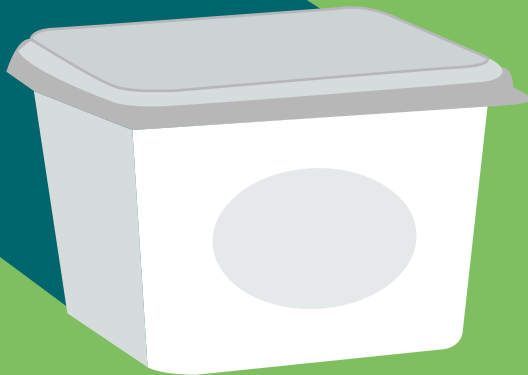
Figure 2: Estimate of Annual Tonnage of Curbside Recyclable Material Generation by U.S. Single-Family Households

Material	Tonnage
Cardboard	5,195,756
Mixed Paper	14,722,469
Aseptics & Cartons	295,586
PET Bottles	2,478,193
Non-bottle PET	524,009
HDPE Natural Bottles & Jars	512,905
HDPE Colored Bottles & Jars	786,644
Glass Containers	7,613,441
Steel Cans	1,126,674
Aluminum Cans	1,002,515
Aluminum Foil & Trays	273,814
Other Plastic Packaging (~3-7)	1,670,402
Bulky Rigid Plastics	1,161,215
Total	37,363,622

Data on the generation of multifamily recyclables generation is scarce but an assumption can be made that multifamily households generate 75 percent of a single-family household's total. Using this assumption, Figure 3 shows the estimated total of all residential recyclables in the U.S.

Figure 3: Estimate of Annual Tonnage of Residential Recyclable Material Generation

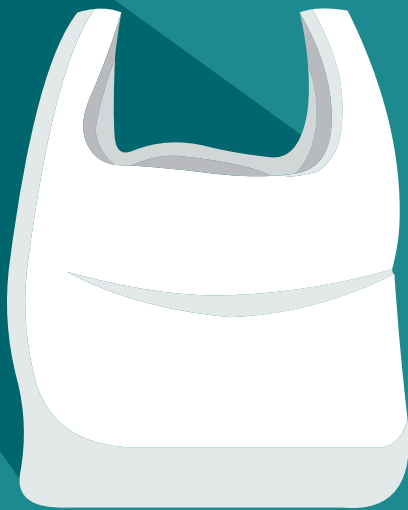
Material	Single-Family Generation	Multi-Family Generation (using 75% Single-Family Generation Factor)	Total Residential
Cardboard	5,195,756	841,076	6,036,831
Mixed Paper	14,722,469	2,383,236	17,105,704
Aseptics & Cartons	295,586	47,849	343,434
PET Bottles	2,478,193	401,164	2,879,356
Non-bottle PET	524,009	84,825	608,835
HDPE Natural Bottles & Jars	512,905	83,028	595,933
HDPE Colored Bottles & Jars	786,644	127,340	913,984
Glass Containers	7,613,441	1,232,444	8,845,885
Steel Cans	1,126,674	182,383	1,309,058
Aluminum Cans	1,002,515	162,285	1,164,800
Aluminum Foil & Trays	273,814	44,324	318,138
Other Plastic Packaging (~#3-7)	1,670,402	270,400	1,940,803
Bulky Rigid Plastics	1,161,215	187,975	1,349,190
Total	37,363,623	6,048,328	43,411,951



**1.65 billion lbs
per year**

A Closer Look at Polypropylene

Figures 1, 2, and 3 do not break out polypropylene (PP) as a separate resin. The material is used in an array of food and non-food packaging and has largely been collected in curbside programs and sorted in MRFs under the broad category of "3-7" resins. Most MRF specific resin sorting capacity is focused on PET and HDPE which are presumed to be available in higher quantities than PP in the household stream. However, some limited data from capture studies suggest there may be as much as 17 pounds of PP available per year from a single-family household. This would place PP at higher generation rates than both natural and colored HDPE. Total annual PP tonnage by U.S. single-family households would be an estimated 827,000 tons or 1.65 billion pounds.



**7.3 billion lbs
per year**

A Closer Look at Film & Flexible Packaging

The U.S. recycling system has been traditionally focused on paper, bottles, cans, and other mostly three dimensional and rigid packaging. However, as more packaging formats shift to flexible plastics, using low-density polyethylene (LDPE) as the primary resin, this material stream may emerge as a target of curbside recovery. The Recycling Partnership's capture data allows some estimation of the possible supply stream for eventual film and flexible processors and end markets. Average household generation across the spectrum of film and flexible materials appears to be about 75 pounds per household per year. Simple extrapolation shows a potential nationwide single-family supply stream of 7.3 billion pounds per year.⁵

⁵ The [2017 National Post-Consumer Plastic Bag & Film Recycling Report](#) conducted by the consulting firm MORE Recycling on behalf of the American Chemistry Council estimated that around 147 million pounds of post-consumer bags and wrap were collected for recycling that year, roughly 90 percent of which was collected through store drop-off and the rest through MRF sortation.

Overall Material Value

The purpose of curbside collection programs is to capture these commodity materials from disposal and supply them for the manufacturing of new products. As commodities, curbside recyclables begin to have market value when MRFs distribute them into a marketplace of material utilization. With the overall generation estimate in Figure 2, it is possible to project a total market value for all single-family curbside materials using available market indices. Figure 4 shows the total approximate market value of all generated curbside (single-family generated) materials sorted and ready to sell from the MRF.

Figure 4: Estimated Annual Market Value of All Single-Family Recyclable Materials as of November 2019

Material	Annual Tons Available from all Single-Family Households	Material Price per Ton*	Annual Market Value
Cardboard	5,195,756	\$24.69	\$128,283,216
Mixed Paper	14,722,469	-\$1.88	-\$27,678,242
Aseptics & Cartons	295,586	\$22.50	\$6,650,685
PET Bottles (including non-bottle PET)	3,002,202	\$188.60	\$566,215,297
HDPE Natural Bottles & Jars	512,905	\$1,008.00	\$517,418,564
HDPE Colored Bottles & Jars	786,644	\$262.00	\$206,572,714
Glass Containers	7,613,441	-\$20.70	-\$157,674,363
Steel Cans	1,126,674	\$80.63	\$90,848,151
Aluminum Cans (Including Aluminum Foil & Trays) ⁶	1,276,329	\$1,025.00	\$1,308,237,225
Other Plastic Packaging (~#3-7)	1,670,402	\$5.00	\$8,352,010
Bulky Rigid Plastics	1,161,215	\$48.80	\$56,667,292
Total	37,363,623		\$2,703,892,549

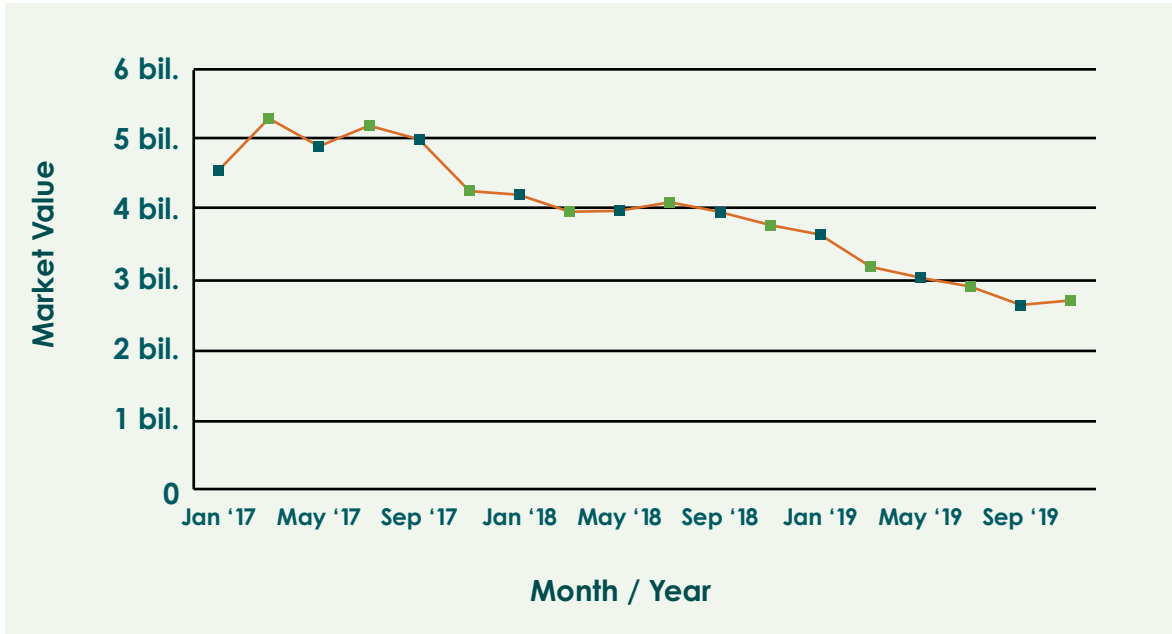
*Source: National average index pricing from recyclingmarkets.net and annual value calculations projected from November 2019 pricing

As Figure 4 shows, if every pound of curbside materials was collected and processed for market, it would yield a net revenue stream of \$2.7 billion to support, but, as discussed below, far from fully cover curbside material collection and processing.

⁶ Though aluminum foil and trays are often sold to different end markets than standard aluminum cans (or UBCs), no separate pricing data was available for foil and trays, so were combined for Figure 4.

Figure 5 shows how the combined value of this material has declined by 41 percent since early 2017, much of which is due to a massive drop in fiber prices brought on by the collapse of mixed paper export markets and a related imbalance in cardboard demand. Of the total decrease from a peak of \$5.3 billion in March 2017 to \$2.7 billion in November 2019, theoretical market value of single-family household mixed paper and cardboard alone dropped \$2.1 billion to \$.1 billion, a decline of \$2 billion. But fiber is not the only material experiencing market challenges. As of November 2019, according to The Recycling Partnership’s analysis of material prices, aluminum dropped 33 percent, steel cans 54 percent, colored HDPE 34 percent, and PET 45 percent in theoretical total values from their highs within this two-year period.⁷

Figure 5: Total Market Value of all Single-Family Curbside Materials



Source: National average index pricing from recyclingmarkets.net

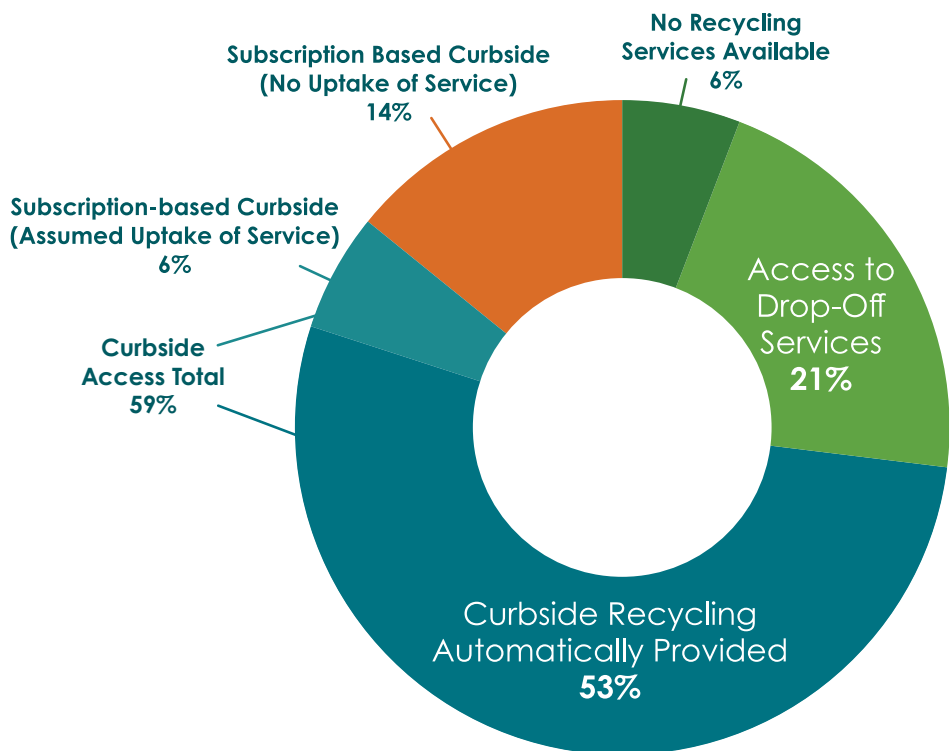
The total market value of generated recyclable materials is just part of the overall dimensions of the U.S. curbside recycling system. Figure 4 shows the market values as if all feasible materials were captured – a theoretical performance of 100 percent system efficiency. However, not all curbside materials are captured for economic use. The majority is still disposed of because of issues in recycling access, participation, and capture behavior, three overarching metrics that provide the basic strategic parameters for improving curbside recycling performance.

⁷ The Recycling Partnership analyzed historical material prices from recyclingmarkets.net against typical MRF-processed material ratios from January 2017 through November 2019. Individual material value high points within that time period were compared to November 2019 pricing to calculate percentage changes noted in the paragraph

Curbside Recycling Access

As mentioned earlier, an accurate estimation of U.S. curbside recycling system performance is challenged by a lack of robust and comprehensive data, a serious issue that should be addressed. Seemingly basic statistics, such as the number of active public curbside recycling programs in the U.S. or the number of households they serve, cannot be, at present, calculated on an annual basis. However, the Sustainable Packaging Coalition’s (SPC) 2015-2016 Centralized Study on Availability of Recycling remains a unique and reliable estimation of household recycling access.⁸ Its statistical findings can be used as a starting point to assess the effectiveness of the curbside recycling system. Figure 6 displays SPC’s main access percentage table applied to all U.S. 2017 occupied households. Note that in the SPC analysis, the rate of households choosing to use the offered subscription service, or uptake, was assumed to be 30 percent.

Figure 6: Estimate of Number of Households with Various Kinds of Recycling Access



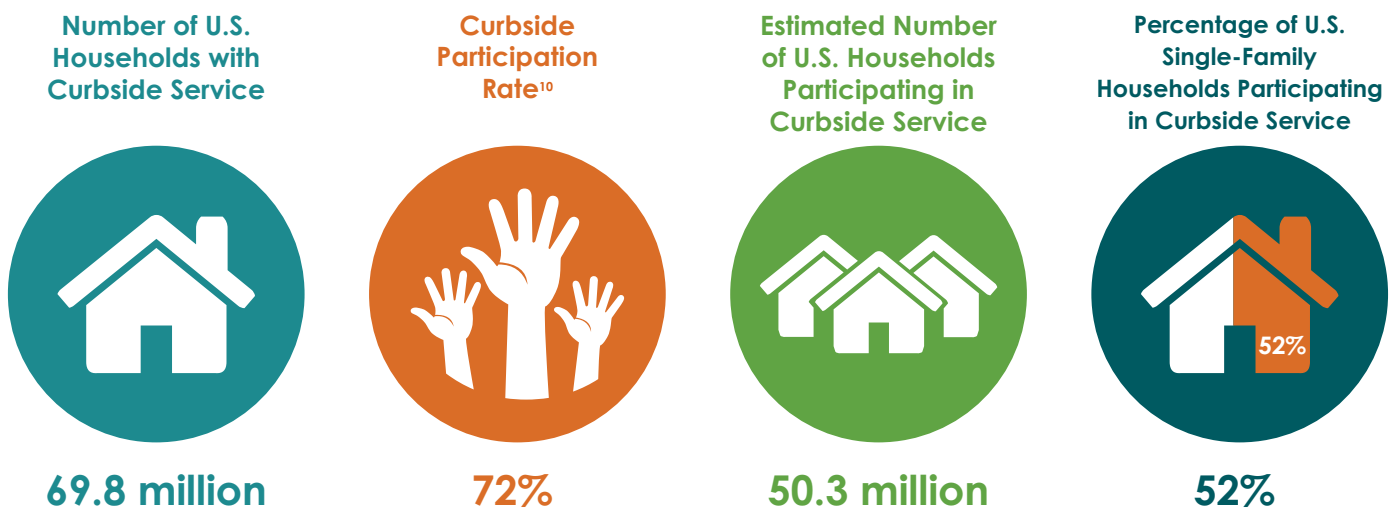
The 59 percent of U.S. households with access to curbside recycling amounts to a total count of around 69.8 million homes. Participation and capture estimates can be applied to this baseline to further explore the overall performance of the U.S. curbside recycling system. As explained earlier, for purposes of the following analysis, the 69.8 million homes are assumed to be single-family homes, defined as dwellings with one to four units. Although some curbside programs serve larger dwellings, one to four is a common parameter in programs across the U.S. Dividing 69.8 million homes with curbside access by a total of 97.3 occupied single-family homes means that 72 percent of all single-family homes have access to curbside recycling services.

⁸ <https://sustainablepackaging.org/findings-released-spc-centralized-study-availability-recycling/>

Curbside Recycling Participation

If almost 70 million homes have access to curbside collection services, how many people consistently use the service? The Recycling Partnership’s 2019 State of Curbside Survey gave respondents the opportunity to answer a set of optional questions, including providing an estimate of their community’s curbside participation rate.⁹ Of the 262 respondents willing to answer the optional questions, 112 (or about 43 percent) supplied a participation estimate. Across curbside programs of all types, the average reported participation rate was 72 percent. Figure 7 applies this general percentage to the number of U.S. households who have access to curbside to estimate the number of U.S. households regularly recycling curbside.

Figure 7: Estimate of Number of Households and Percentage of all U.S. Households Participating in Curbside Recycling



The data in Figure 7 helps to build out an estimate of the U.S. curbside recycling system’s overall efficiency in capturing available material in single-family homes. If only 52 percent of households act as regular participants in curbside provided collection, theoretically only 52 percent of the available 37.4 million single-family tons could feasibly be collected; none of the materials available from homes without access or from homes that don’t use available curbside services would be captured. Applying this percentage to generated single-family recyclables means the maximum amount of material that could feasibly be expected to be captured by the U.S. curbside recycling services – as they are organized today – would be 19.3 million tons per year.

However, that estimate also assumes that all participating households are perfect recyclers, which data shows is not the case.

⁹ Methodology for this data can be found in the appendices of this report.

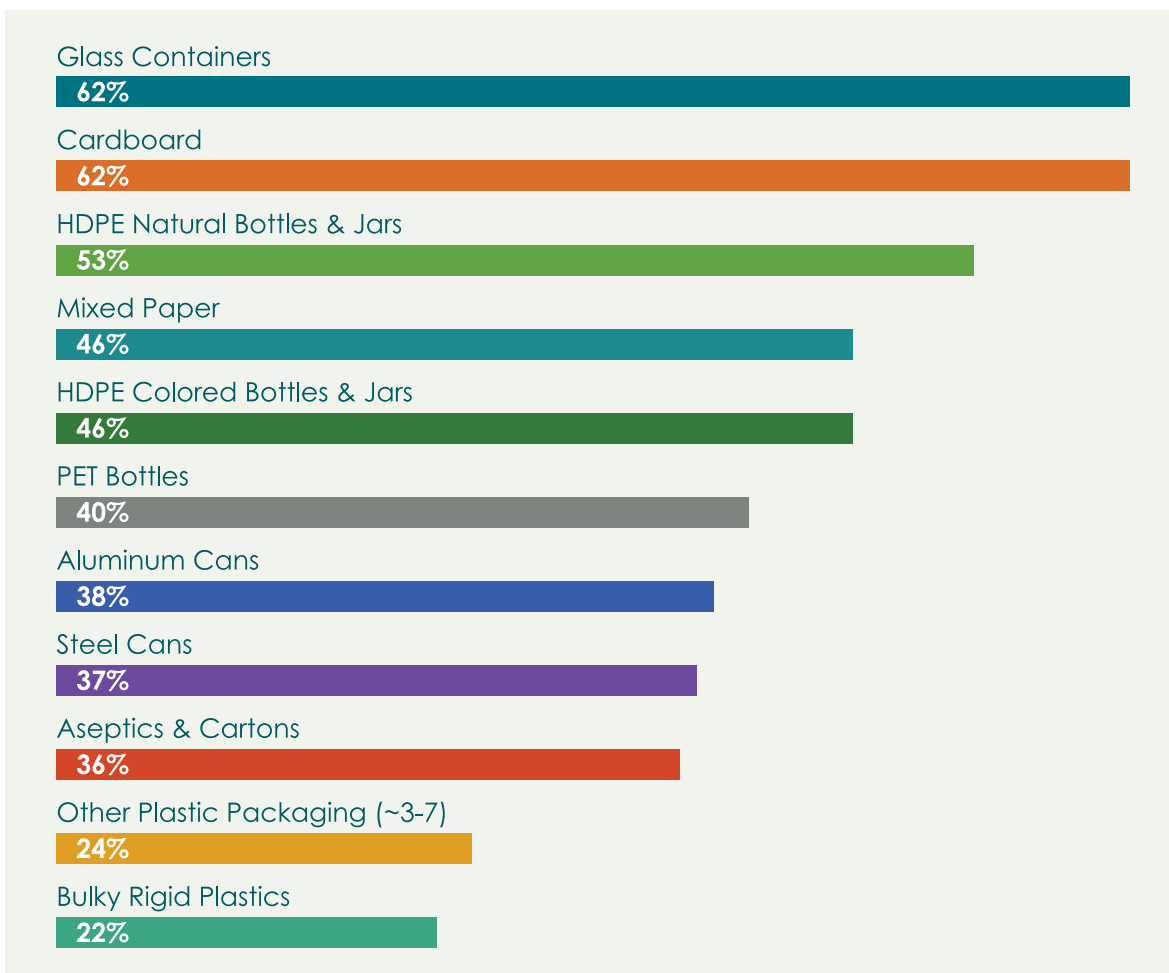
¹⁰ Participation is defined as a household which puts out cart at least once a month or over two-to-three collection cycles.

Curbside Material Capture

An essential performance indicator for curbside recycling programs is the capture rate – the percentage of available material that is recovered at collection. Capture rates can be calculated across an entire community’s residential recyclables (Whole City Capture) or can focus on participating households (Participant Capture).¹¹ Research directed by The Recycling Partnership paired with evaluation of additional studies documents capture rate patterns that paint a picture of opportunity to improve the performance of the U.S. curbside recycling system.

Figure 8 presents the results of The Recycling Partnership’s analysis of capture rate studies and community data where contemporaneous waste composition and recycling composition is available.¹² This table shows the current estimates of whole city capture rates, generally derived from studies examining samples from waste and recycling trucks where both participant and non-participant data is represented (with all non-participant material found in the waste truck).

Figure 8: Data on Whole City Capture Rates by Material Weight*



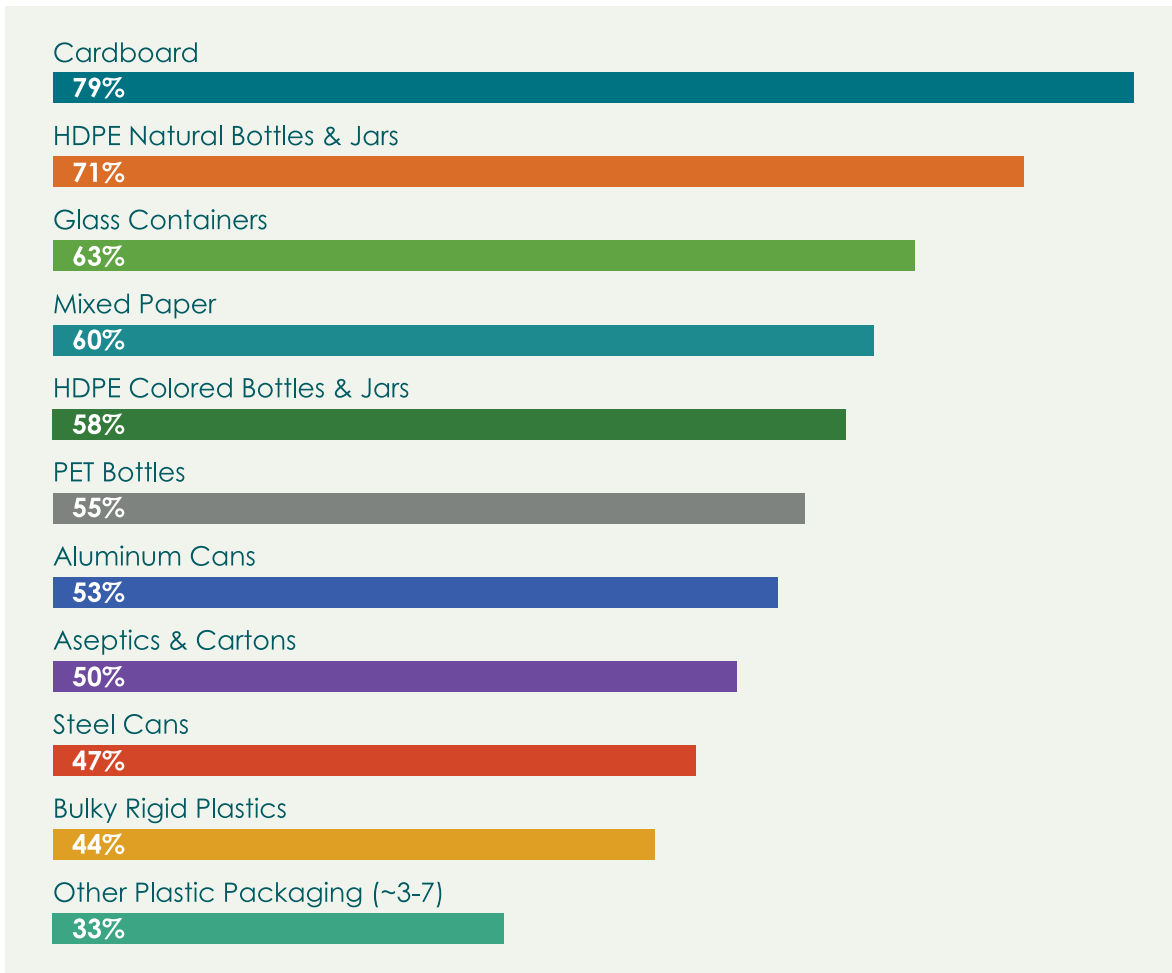
* Averages calculated for materials only where they are included in the locally specified collection mix

Figure 8 shows that some of the most iconic and economically important materials in U.S. households, such as aluminum cans and PET bottles, suffer from low capture rates in whole city analyses. This also holds true for participating households, as shown in Figure 9, reflecting data from studies in which paired household garbage and recycling carts – or set-outs – are analyzed to see how well participants do in recycling specific commodities.

¹¹ Participant capture data can deliver a reliable estimate of household material generation that can be converted into a Whole City Capture calculation if a municipality knows its recycling participation rate.

¹² The Recycling Partnership has conducted numerous capture rate studies in conjunction with specific projects and has gathered additional capture data through reports provided by local governments and consulting firms.

Figure 9: Percentage of Participant Material Capture Rates by Weight*



* Averages calculated for materials only where they are included in the locally specified collection mix

As demonstrated in Figure 9, the lag in high-value material capture is one of the critical issues facing U.S. curbside recycling services and calls for both a greater understanding of household behavior and the development of strategies that reliably improve that behavior.

This data on the recycling behavior of participants provides the final piece of the puzzle to estimate the overall effectiveness of the U.S. curbside recycling system. Across all participant capture studies available to The Recycling Partnership, the average participant capture rate for all curbside materials is 61.5 percent. Figure 10 applies this overall participant capture rate to the 19.3 million tons available in participating curbside-served households.

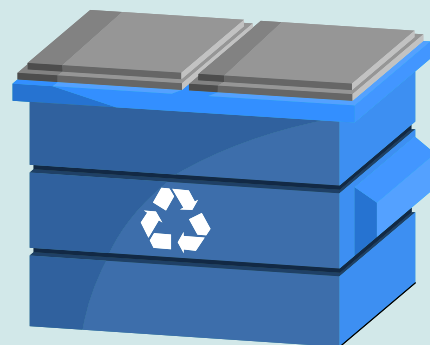
Figure 10: Estimated Total Collected Tonnage of Single-Family Curbside Materials



Figure 10 shows that the U.S. curbside recycling system is currently only 32 percent efficient in its task of delivering single-family household recyclable commodities to the circular economy. This level of achievement is a function of shortfalls in access, participation, and capture, all of which can be addressed by smart and direct interventions. Using the same source of November 2019 pricing in Figure 4, the market value of this estimated collected material is \$861 million, which falls well short of the current estimated cost of collecting that material.

Additional Material Capture Beyond Curbside Recovery

Current curbside recovery of only 32 percent of all single-family recyclables in the U.S. is a sobering statistic, but it does not represent the total recovery of these materials. Two major other mechanisms pull additional material away from disposal and back into the circular economy: recycling drop-off programs and state container deposit programs. Unfortunately, no comprehensive data exists to estimate the additional recovery achieved through drop-off, but substantial parts of the U.S. depend on this method of material capture – rural areas, in particular, but also some large American cities. An assessment of how much overall single-family material that deposit programs capture is also difficult because none of the programs analyze the specific source of deposit-returned material (i.e., how much comes from single-family residential versus commercial or multifamily sources).



However, it can be conjectured that drop-off approaches, with lower participation rates than curbside, and deposit programs, with a recovery scope limited to varying ranges of PET, glass, and aluminum containers could add as much as 8-10 percent additional single-family material capture. If so, then that means about 6 out of every 10 tons of single-family recyclable material is disposed of in U.S. landfills and waste incinerators.¹³

¹³ Additional capture of single-family household recyclables occurs through mechanisms such as aluminum buy-back, steel can recovery from waste-to-energy incinerator ash, but the impacts of those mechanisms cannot be measured by currently available public data.

Recyclable Recovery by Household



These 10 homes generate 7,680 lbs of recyclable material per year.



3 of the 10 don't participate in recycling at all.
They dispose of 2,150 lbs of recyclable materials each year.



Those that do participate still put some (38.5%) of their materials in the trash, disposing of another 2,130 lbs.

Knowing what to throw into the recycling, would increase materials captured. By implementing our strategies, together, we could collect another 2,130 lbs. from these participating houses.

Understanding System Costs

How much does it cost to provide a household curbside recycling collection service per year? This can be a difficult question to answer because of all the possible variables that go into the calculation, including daily operational costs, the cost of capital, administrative costs, and MRF processing fees that are now commonplace. Still, where communities charge specific household recycling fees that are intended to cover the full cost of service, it is possible to get a sense of curbside collection costs.

Thirty-two communities responding to The Recycling Partnership's 2019 State of Curbside Survey reported charging specific household recycling fees designed to cover the full cost of the collection service. Of those communities, 23 quoted specific fee data, with an average monthly charge of \$4.39 per month or \$52.64 per year. Additional respondents reported charging fees where the full cost of recycling is not covered. This data actually shows a higher fee rate of \$6.05 per month, or \$72.55 per year, even after eliminating outliers to the data.

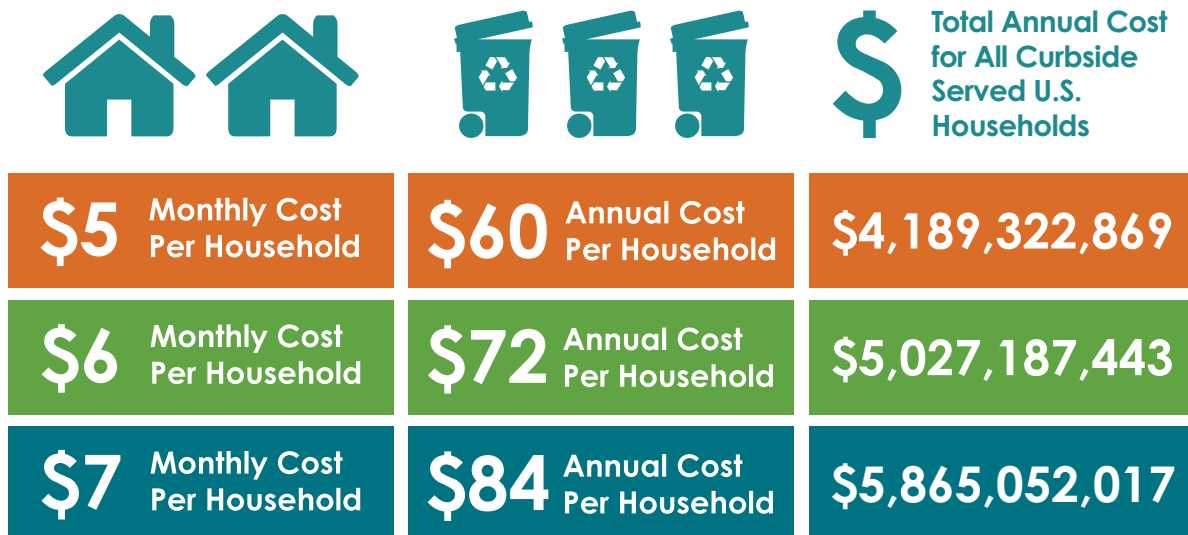
The 2019 State of Curbside Survey received data from an additional 18 communities with specific budgeted data for their curbside program along with specific data on the numbers of households they serve. This data yields an average annual cost of \$54.70 per household, or \$4.56 per month.

Beyond this survey data, anecdotal information provides further insight into the cost of delivering curbside service. Because a subscription program must theoretically bear its own costs, subscription charges can be an indicator of service costs. Curbside service subscribers in the city of Indianapolis pay a fee of \$99 per year or \$8.25 per month. However, curbside collection routes in Indianapolis are likely very inefficient with many homes passed by to pick up from the few that subscribe (subscription uptake in Indianapolis is estimated to be 10 percent). In another subscription community, Colorado Springs, the cost quoted on the website of one major local hauler (which also operates the local MRF) to add curbside recycling to garbage service is \$5.30 per month.

Further, a benchmarking study of solid waste and recycling services in 14 North Carolina communities conducted from 2013 through 2017, found an average per capita cost of delivering recycling services “per collection point” to be \$39.44, or \$3.28 per month.¹⁴ These numbers, applying full cost accounting methods, would likely be higher now due to the effects of inflation and processing charges.

While it is difficult to draw strong conclusions about the cost of providing curbside service from this limited data, it can still be used to estimate the total cost of U.S. curbside recycling collections for the current estimated 69.8 million households served. Figure 11 shows those estimated costs for that service, roughly \$4.2 to \$5.9 billion annually, which is chiefly borne through local taxation and accomplished through the exercise of local political will.

Figure 11: Scenarios of Estimated Total Annual Collection Cost for U.S. Curbside Recycling



¹⁴ <https://www.apexnc.org/DocumentCenter/View/9795/Benchmarking-Study?bidId=>



Chapter 2: Local Curbside Program Performance

Chapter 1 presented a high-level overview of the U.S. curbside recycling system, demonstrating the power of metrics like capture rates and broadly pointing toward opportunities for tactical action to bring nationwide improvement. However, such a general analysis can hide significant details and nuances in how material capture and local services can vary across communities. The truth is that curbside recycling across the U.S. is a spectrum of poor to excellent programs, all serving households that generate different amounts of materials.

What do we know about community programs themselves and how they are performing? A key metric in making that assessment is pounds per household served. It is a simple and universally applicable yardstick that divides the annual tonnage collected curbside by the households eligible for curbside service. The Recycling Partnership's [2016 State of Curbside Report](#) focused attention on this essential benchmark, finding that, on average, curbside programs recover 357 pounds per household per year.

Using data from The Recycling Partnership's 2019 State of Curbside Survey, plus information gathered through the Municipal Measurement Program, and a research project by The Recycling Partnership on West Coast cities, this report provides an update of this essential performance metric.¹⁵ Across the available data from a broad size and geographic spectrum of communities, Figure 12 shows the pounds per household performance levels for the whole dataset. It further provides a breakdown of programs in which recycling containers are provided automatically to eligible households compared to programs in which households need to take proactive steps, or opt in, to receive the service.

¹⁵ Information on data sources used for this report can be found in Appendix A

Figure 12: Average and Median Pounds per Household per Surveyed Community Curbside Programs

	Average Pounds per Household Collected on an Annual Basis	Median Pounds per Household Collected on an Annual Basis	Number of Community Data Points
All Programs	440.16	430.38	436
Programs with Automatically Provided Service	459.06	449.90	365
Programs Requiring Subscription or Opt-In Option	331.09	278.97	56
Other Programs - Mix of Automatic and Opt-In Options	392.77	337.50	15

Requiring households to opt-in is a detriment to material capture. The conversion of opt-in programs in the U.S. to universal service would address this shortcoming.

The information in Figure 12 may overestimate the typical performance of opt-in programs. The available data included a few very high-performing programs that skews the average higher and is reflected in the substantial difference between the average and median data. Nevertheless, the Figure points out the clear performance advantages of automatically providing service in a curbside program, delivering across the average 128 more pounds of material collection and across the median almost 170 pounds.

Exploring More Detail on Pounds per Household Calculations

The data reported in Figure 12 stating 440 pounds collected per year differs from The Recycling Partnership's 2016 State of Curbside report findings that curbside programs collect 357 pounds per household per year. One explanation for the gap is that the two studies looked at different categories of communities. The Recycling Partnership's 2016 State of Curbside report focused on 460 specific communities constituting 20 percent of the population in each state, while The Recycling Partnership's 2019 State of Curbside Survey invited data from communities willing to respond to a voluntary survey. As noted elsewhere in this report, the capability and willingness to respond to a survey may skew toward higher performing programs.

In addition, The Recycling Partnership's 2019 State of Curbside survey contains data from a slightly higher representation of cart programs and a lesser representation of opt-in programs; two factors that would make the 2019 estimate higher. On balance, the 2019 data set also includes more West Coast communities; to test the effect of this, dropping all California, Oregon, and Washington communities out of the calculations reduces the average pounds per household to 417 and the median to 405.

Finally, a different alternative statistical approach to the 2019 data also delivers a lower result. Instead of conducting the average calculation across individual programs, a calculation dividing the total of reported households by the total reported tons across the whole dataset produces a lower result of 413 pounds per household.

Curbside collection programs provide service through a variety of different kinds of containers: bins, bags, carts, cans, and, in some programs, whatever containers a household wants to use, usually within certain size or appearance parameters. Figure 13 shows the range of pounds per household by the types of containers used in various collection programs. A surprising number of programs offer

a range of containers – e.g. bins for some households and carts for others, or a variety of cart sizes. For example, 242 out of the 435 programs analyzed provide some combination of cart sizes for their households. For each of the specified types of programs represented below, data is presented for only those programs that solely use that kind of container.

Figure 13: Pounds per Household Curbside Program Performance by Type of Container

	Average Pounds per Household Collected on an Annual Basis	Median Pounds per Household Collected on an Annual Basis	Number of Community Data Points
Bin	360.38	363.33	48
Bag	324.79	353.68	6
Cart	458.81	452.60	242
Programs Using a Combination of Bins & Carts	451.54	448.77	47

Figure 13 further validates The Recycling Partnership’s 2016 State of Curbside report that cart-based services collect more material than bin- or bag-based programs. The roughly 100 pound - or almost 28 percent difference - underscores that moving the bin-based programs to carts is still an enormously important strategy for improving the performance of U.S. curbside recycling services. The difference between bag-based and cart-based collection is even more pronounced and indicates substantial opportunity to increase material capture.

The roughly 100 pound - or almost 28 percent difference - underscores that moving the bin-based programs to carts is still an enormously important strategy for improving the performance of U.S. curbside recycling services.

Figures 12 and 13 reported data as *collected* pounds in curbside programs. However, all curbside collected material includes materials that are not wanted, such as trash and other non-recyclable materials, commonly referred to as contaminants.



Case Study

From left, City of Sarasota, Fla. Solid Waste Division Supervisor Jonathan Williamson and recycling driver Pito Ortega working together to roll out carts to Sarasota residents as part of our Coastal Communities and Waterways grant to help keep litter out of our waterways.

Sarasota's Recipe for Success:

Education + Carts = High Participation, More Material, and Less Contamination

Participation and collection volumes are up, and contamination is notably lower in the City of Sarasota following a city-led recycling program reboot this spring that included amped-up education and new, 95-gallon single-stream carts.

The Recycling Partnership puts private dollars to work, helping communities invest in systems that protect resources and empower residents to take sustainable action. Through a \$1 million donation from the Coca-Cola Foundation, The Partnership recently opened its first Coastal Communities and Waterways Grant.

One of the first communities to be awarded a Coastal Communities and Waterways grant, Sarasota is an ideal location for the implementation of carted recycling. A community of 57,000 residents, located 60 miles south of Tampa on the Florida Gulf, Sarasota hosts a thriving tourism industry, unique recreational activities and ample opportunity to learn about the local waters and the life that depends upon them. Most of all, Sarasota has a staff that was ready to take on the project.

“We thought we had some good ideas ... but getting The Recycling Partnership’s input and experience really enabled us,” says Jonathan Williamson, solid waste division supervisor for the City of Sarasota. Williamson notes that the new program took about 18 months from inception to launch.

Since collection with the new, closed-lidded carts began April 1, 2019, about 75 percent of households have been participating in the program, which collects every other week, Williamson says.

Recycling volume is up too—about 71 percent over a year ago.

Another win? “We are also getting feedback from (the place) where we are hauling our recyclable material that it is very clean,” says Stevie Freeman-Montes, the city’s sustainability manager.

Freeman-Montes attributes these successes to the robust recycling education taking place around the transition. While the city already had single-stream recycling, it had been using 18-gallon bins before switching to two-wheeled carts. The additional funds and technical assistance provided by

The Recycling Partnership’s grant allowed Sarasota to ramp up recycling education.

The roll-out also included community events and cleanups to bring attention not only to recycling, but also to the ways that better recycling and decreased litter are connected. Education also connected the dots to how clean and beautiful waterways in Sarasota influence the community’s financial health by way of a healthy tourism industry and ample opportunity for outdoor recreation.

The new, improved recycling program in Sarasota is part of the city’s long-term sustainability planning — the goal of which is a 100-percent sustainable Sarasota by 2045.

“The future in Sarasota, because we’ve implemented this new recycling single-stream recycling program, is that we’re going to be cleaner and more beautiful,” says Freeman-Montes. “It’s going to help raise awareness about recycling and waste reduction strategies overall.”



Sarasota by the Numbers

100% Sustainable Sarasota by 2045*



**57,000
Residents**



**15,000
Households**



**18 Months
Recycling Program
Inception to
Launch**



**75%
Recycling
Participation**



**71%
More Recycling
Volume****

*City of Sarasota sustainability plan goal.

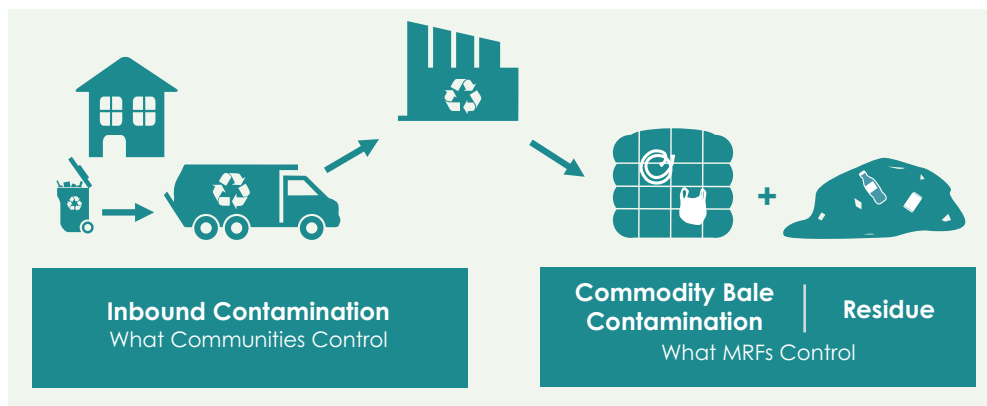
**April 2019 compared to April 2018 recycling collection.

Curbside Contamination Rates

Concerns about material quality have grown tremendously important in the wake of weak market conditions. As a general term, “contamination” refers to the material that residents include in their recycling collection but is not accepted in their curbside program as well as material that is on the list of acceptable materials but has unacceptable amounts of residue. Over the past two years, media stories and some industry spokespersons have cited average contamination rates that are more than 30 percent. But what does the data say?

To effectively improve material quality, a community should specifically know its *inbound* contamination rate, which measures the amount of contamination, or non-commodity material, in loads being delivered to the MRF from curbside collection routes. The inbound contamination rate is different from the residue rate, which measures the amount of all material that is sent to disposal after having been processed in a MRF.

Three Types of Contamination



Contamination of the residential recycling stream takes three forms: contaminants in inbound materials, contaminants in commodity bales produced by the MRF, and overall MRF residues (which may contain some good commodities). MRFs and communities should work together to analyze inbound loads and pursue strategies to effectively address inbound contamination.

Data collected from The Recycling Partnership's 2019 State of Curbside survey, supplemented by research of West Coast communities and submittals to the Municipal Measurement Program, indicate that about 35 percent of communities know their inbound contamination rate, which averages 16.9 percent.¹⁶

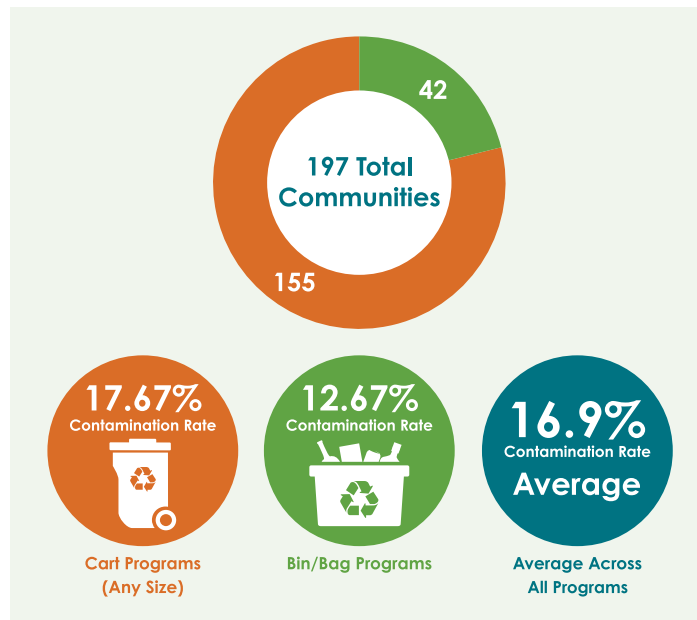
Figure 14: Percentage of Communities in The Recycling Partnership's 2019 State of Curbside Survey That Know Their Inbound Contamination Rates



¹⁶ The majority (57 percent) of communities that know their inbound contamination rate received this information from their MRF through periodic audits of their community's specific inbound material. Nearly 15 percent of respondents who know their inbound contamination rate receive data from their MRF that represents all the communities that are coming to the MRF and is not specific to their community. The rest of survey respondents receive their inbound contamination data from haulers or other sources.

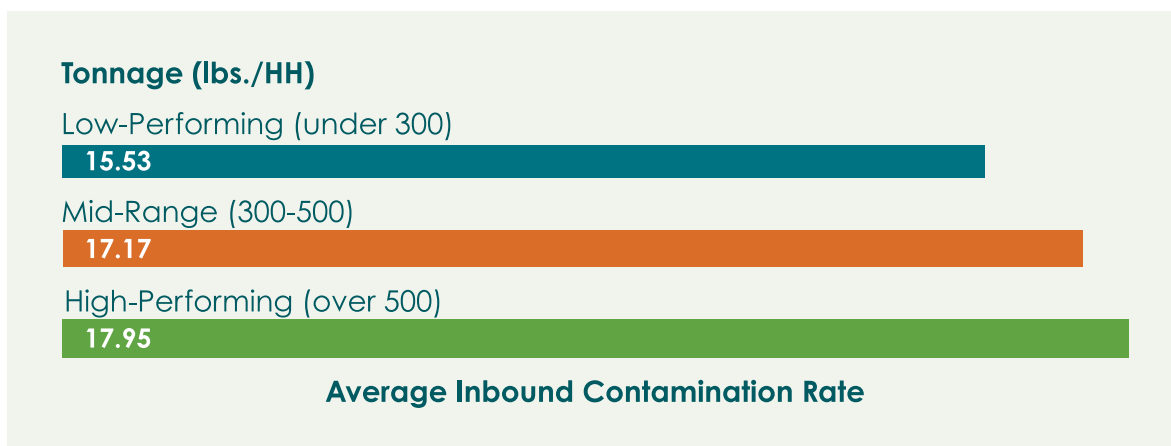
Figure 15 compares the average contamination rates among different groups of respondents based on different characteristics of a community recycling program. Cart-based collection services have been presumed to have inbound contamination rates drastically higher than bin programs. There is no previously published data comparing the contamination rates of bin- and cart-based collection for community recycling programs across the U.S. The Recycling Partnership's 2019 State of Curbside Survey finds that the average inbound contamination rate for bin/bag-based programs is approximately five percentage points lower than cart-based programs.

Figure 15: Differences in Inbound Contamination Rates for Bin vs Cart Programs Among The Recycling Partnership's 2019 State of Curbside Survey Respondents.



The Recycling Partnership's 2019 State of Curbside Survey data can also be broken down for high-performing, mid-range, and low-performing programs in terms of collecting pounds of recyclables per household. While there was some slight variation, the data does not show any significant difference between the average inbound contamination rates.

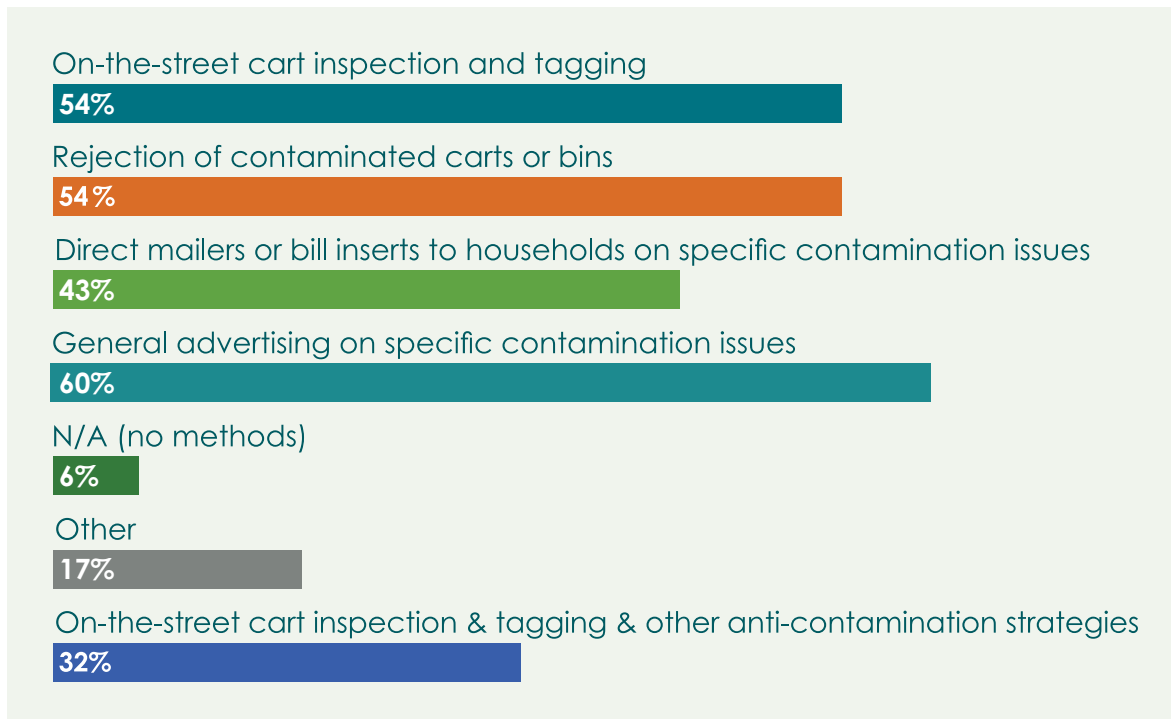
Figure 16: Difference in Inbound Contamination Rates by Program Performance Levels



Community Actions to Address Contamination

The Recycling Partnership's 2019 State of Curbside Survey provides a glimpse into how communities are taking action on contamination issues, as displayed in Figure 17. Approximately 22 percent of survey respondents implemented all four anti-contamination strategies recommended by The Recycling Partnership - cart tagging (putting oops tags on carts that tells a resident what materials were found in their carts that don't belong), rejecting contaminated carts (not picking them up and leaving them on the curb), sending direct mailers or bill inserts to residents on what recyclables are and are not accepted, and using general advertising to promote what recyclables are and are not accepted.

Figure 17: Methods of Contamination Control Reported by The Recycling Partnership's 2019 State of Curbside Survey Respondents



The Recycling Partnership's Website

The Recycling Partnership's website offers free online resources to communities that outline the best management practices for tackling contamination both at the curb and at community drop-off recycling centers. Find our [Anti-Contamination Toolkit](#) and [Campaign Builder](#) online which has been designed to provide steps, tools, and resources to help improve the quality of your recycling program.



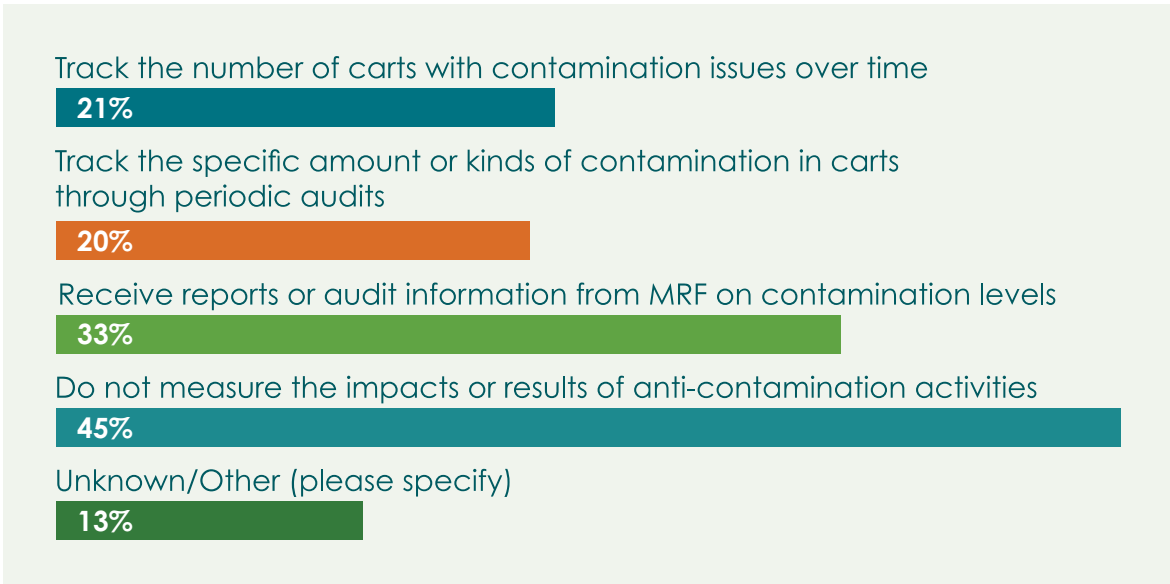
Anti-Contamination Recycling Kit

.....

Improving Quality in Your Recycling Program

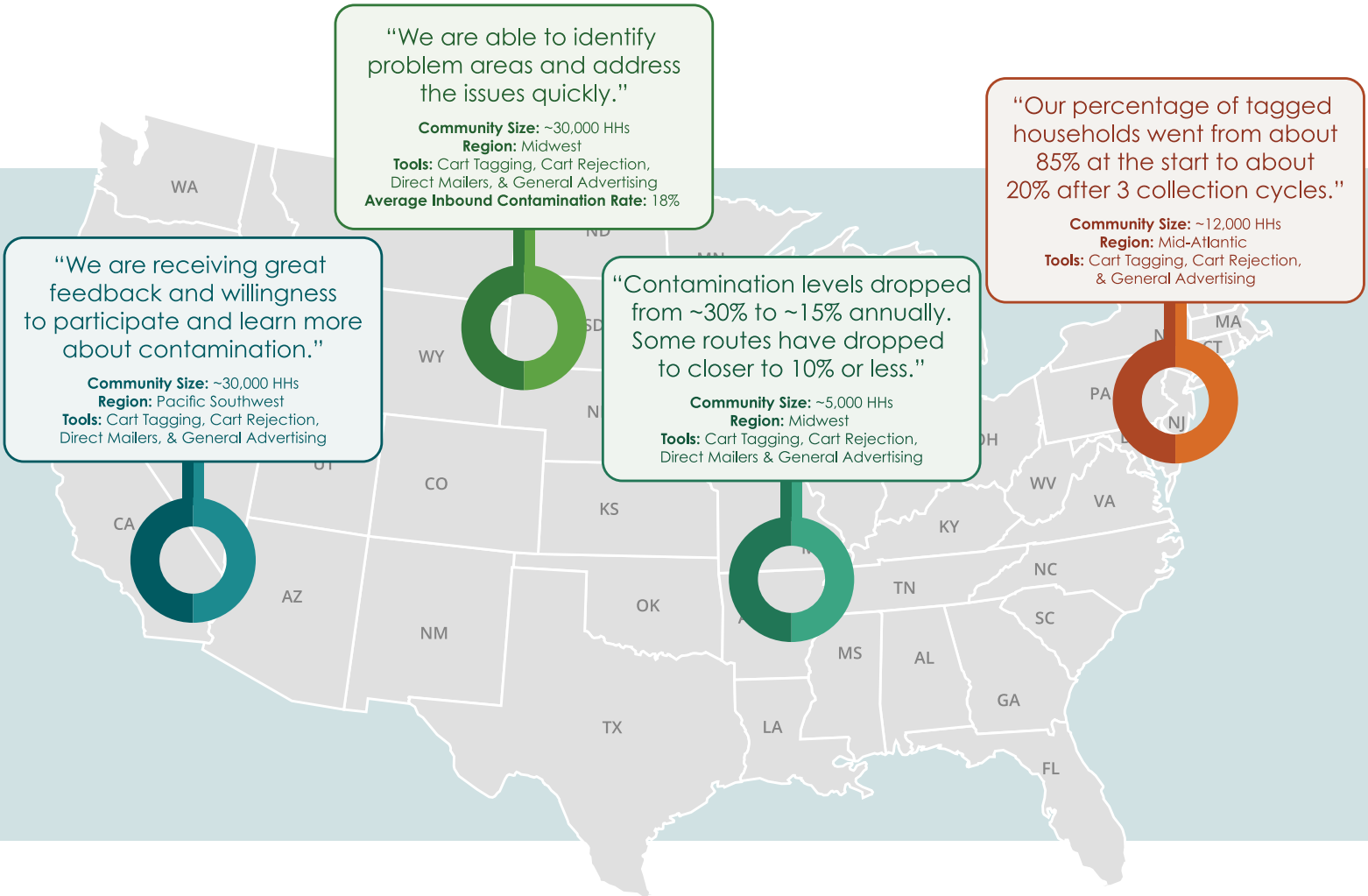
To evaluate the effectiveness of anti-contamination strategies on material quality, a community must be able to benchmark and measure its progress. Figure 18 shows that communities use a variety of metrics to track their impacts, but that nearly half conduct no measurement and another 13 percent do not know.

Figure 18: Methods of Measuring the Impact of Anti-Contamination Efforts by The Recycling Partnership’s 2019 State of Curbside Survey Respondents

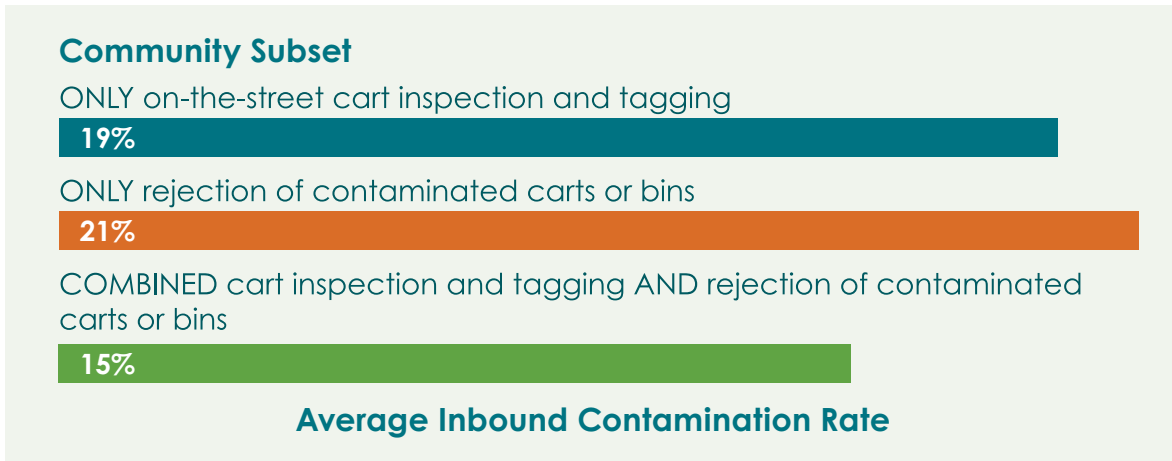


*Percentages add up to more than 100% because some communities use combinations of the first three methods.

Community Partners Using The Recycling Partnership's Anti-Contamination Strategies Comment on their Efforts



Cart-tagging is most successful when the practice of cart inspections is combined with the rejection of worst-case instances of contamination. The Recycling Partnership’s 2019 State of Curbside Survey data in Figure 19 shows that the average inbound contamination rates are lowest in communities where tagging and rejection methods are jointly implemented.

Figure 19: Mix of Methods used by Curbside Programs to Address Contamination

Curbside Program Staffing Resources

Curbside programs can address inbound contamination and better deliver a steady stream of high-quality recyclable materials, or optimize their program's performance, if they have the staffing and outreach resources to support those efforts. The optional questions asked in The Recycling Partnership's 2019 State of Curbside Survey provides a glimpse into the level of dedicated staffing for curbside programs. Of the 262 communities who answered the additional questions, 145 or 55 percent of those programs indicated they employed a dedicated recycling coordinator position.

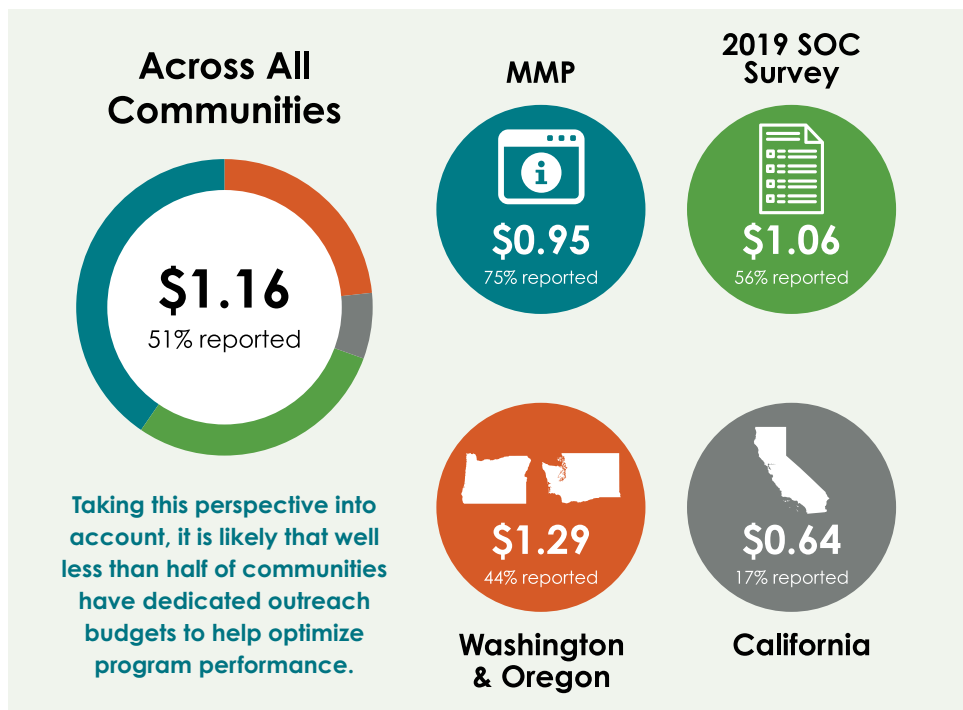
It would be misleading to extrapolate this statistic across all curbside programs in the U.S. As discussed earlier, there may have been a degree of "self-selection" in the response to The Recycling Partnership's 2019 State of Curbside Survey, with a very low likelihood that communities with no dedicated staff would respond to such a survey. The average number of households served by the communities who responded to the question was also on the high end of community size at 62,632, where resources to hire a dedicated coordinator are more available. With these factors in mind, **it is safe to say that most curbside recycling programs in the country do not have dedicated staff to help optimize program performance.**

Curbside Program Outreach Resources

Budgetary resources for recycling outreach allow programs to optimize participation, capture, and material quality. Combined data from The Recycling Partnership’s 2019 State of Curbside Survey, MMP, and the Partnership’s West Coast Contamination Initiative shows insights into how programs are faring on this issue. Of the verified data community reports for MMP, a healthy 75 percent of communities indicated having an outreach budget for recycling, with the average funds available at \$.95 per curbside household served. Of 262 The Recycling Partnership’s 2019 State of Curbside Survey respondents answering optional questions, 56 percent reported an outreach budget averaging \$1.06 per curbside household served. In West Coast research, 44 percent of Washington and Oregon communities reported having a dedicated recycling outreach budget at an average of \$1.29 per household while the 17 percent of California communities reporting a dedicated budget are spending \$.64 per household. Across all of the communities from all sources of data for this analysis, 51 percent reported having a dedicated budget spending \$1.16 per household.

As with the dedicated recycling coordinator question, this outreach budget data should also not be projected across all U.S. curbside programs. Again, among other issues, communities who are generally higher-performing are the ones likely to respond to data requests like The Recycling Partnership’s 2019 State of Curbside Survey and this can exaggerate the percentage of all communities with outreach budgets and the funding levels of those budgets. Taking this perspective into account, it is likely that well less than half of communities have dedicated outreach budgets to help optimize program performance.

Curbside Programs Outreach Budgets per Household



Insights into Local Program Performance

This chapter has shared key data on how the local recycling programs that form the foundation of the U.S. recycling system are performing in collecting recyclable commodities and addressing challenges like contamination. Their efforts provide a baseline level of material capture from which the system can improve, but the ability to make such improvements are hampered by negative market conditions explored in Chapter 3.



Case Study



Recycling More, Better in Ohio

Proven Techniques to Improve Recycling in Central Ohio

Partnering with the Solid Waste Authority of Central Ohio (SWACO) and funded in part by the PepsiCo Foundation, The Recycling Partnership provided a grant for new, lidded, 65-gallon recycling carts to more than 38,000 households across five communities in 2019 in the central Ohio area.

Although these towns had historically seen strong performance in long-standing bin programs, the carts were able to increase annualized recycled weight for the five communities by almost 800 tons, or about 41 pounds per household per year.

Helping Residents Recycle More and Recycle Better

In addition to purchasing new carts, SWACO and The Recycling Partnership provided recycling education materials to all residents around central Ohio when the carts were distributed at the end of May. As part of SWACO's ongoing "Recycle Right" program, these educational materials include guidelines for what can and cannot be recycled in Franklin County to help residents recycle more, better.

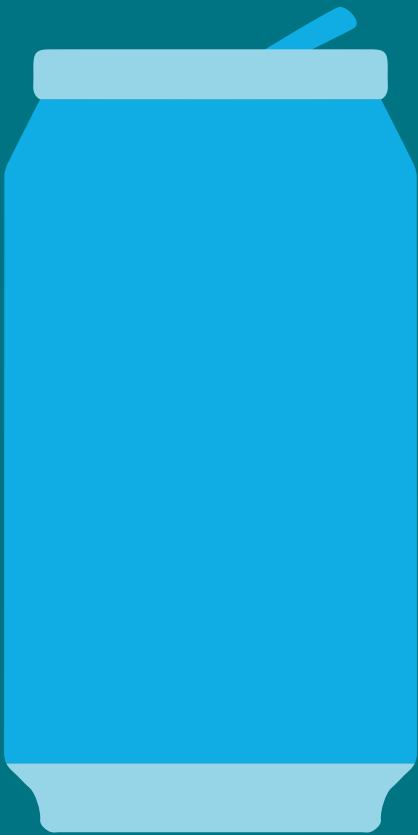
Measuring Results

As part of the SWACO project, The Recycling Partnership conducted a first-of-its-kind, before and after study using two different methodologies to gauge the increased recovery of individual commodities in the towns of Gahanna and Reynoldsburg. The SWACO capture rate study looked specifically at recycling collected in Gahanna and Reynoldsburg, two of the five central Ohio communities that switched to 65-gallon carts. Funding for the study was provided by the PepsiCo Foundation, the Carton Council, and SWACO.

Study data showed the beneficial results of cart-based collection for some key materials. For PET bottles, the capture rate increased across all households by 22% while aluminum saw an increase of 111%. Data also showed improvement in recycling behavior in participating households from the transition to carts. Previously with bins, 52% of homes recycled 60% or more of their recyclable material; with carts, 74% of homes recycled at the 60% rate or higher.

The data is a very encouraging sign that, even for towns with fairly good recycling performance in bins, carts can effectively increase how well households recycle and can raise the specific capture rate of beverage containers.

Previously with bins, 52% of homes recycled 60% or more of their recyclable material; with carts, 74% of homes recycled at the 60% rate or higher.



Chapter 3:

How Changing Material Values are Impacting Local Curbside Programs

How well are U.S. communities equipped to improve on a curbside efficiency rate of 32 percent and an average inbound contamination rate of 16.9 percent? The answer starts first with exploring the current issues facing community programs. In short, the relatively sudden and now persistent weakness in market prices for curbside collected recyclable materials has deepened the cost burden of operating recycling programs for communities.

Financial Pressures on Local Recycling Programs

Market issues have been precipitated by numerous factors, including China's scrap ban and other export restrictions. These market challenges have been exacerbated by structural issues in some domestic commodity sectors, increased competition with cheaper new materials, and changes in packaging design that have introduced more complexity to collection, processing, and educational efforts. These combined circumstances have created a fundamental change in the value of collected curbside recyclables.

An indicator of this change is reflected in the "blended value" of collected curbside materials, a calculation of the value on all of the incoming materials to a MRF.¹⁷ This blended value reflects not only the value of good material coming into a MRF, but also contaminants in the collected material stream. It nets the relative percentages of materials and their relative values into an overall index price. Figure 20 shows The Recycling Partnership's analysis of what a typical mix of collected material has experienced since early 2017.

¹⁷ Blended values are sometimes also called "average market value" or "average commodity revenue"

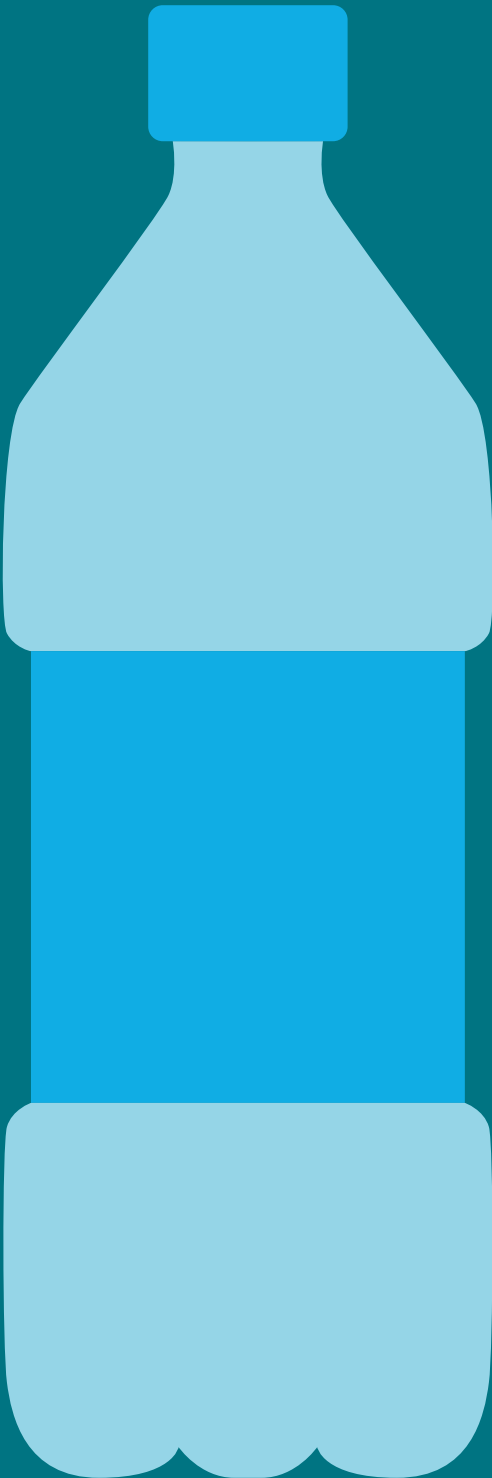
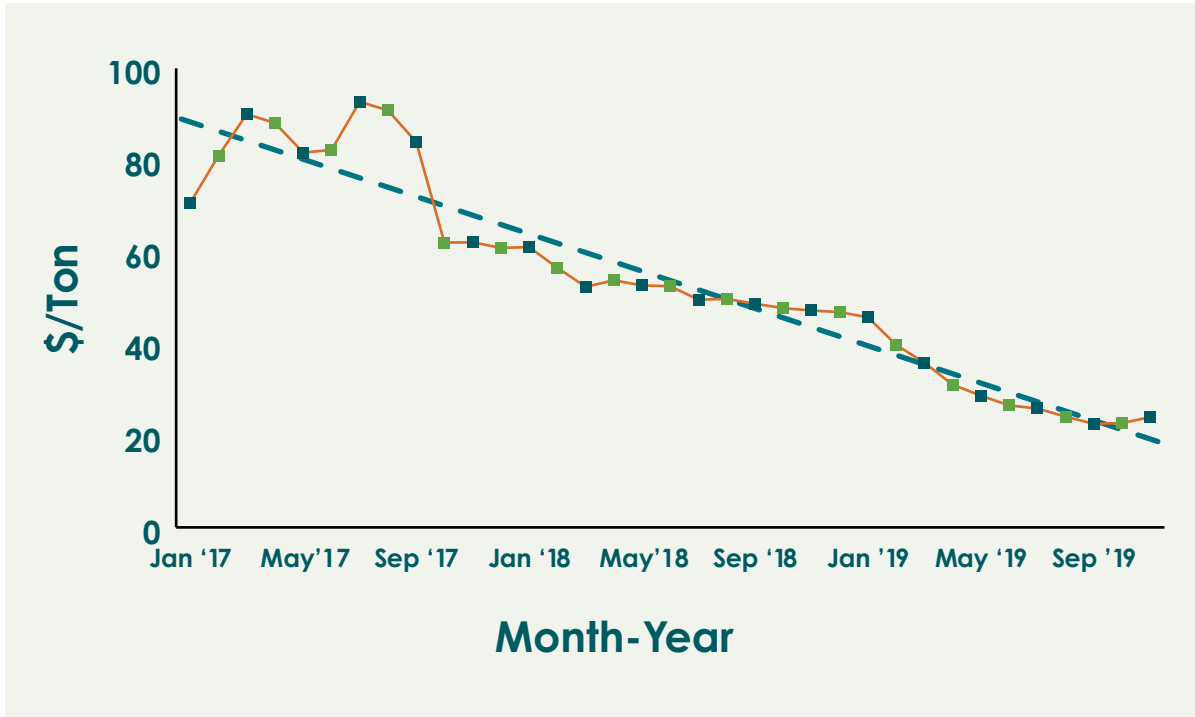


Figure 20: Blended Material Values (including residues) January 2017 – November 2019



The data in the graph indicates blended values in the \$24 per ton range as compared to more than \$90 per ton in July 2017. To underscore and validate this general trend, The Recycling Partnership surveyed seven MRFs in November 2019 to check on the status of material values. Figure 21 shows the composite of the reported data, putting the blended value number at \$36.30 per ton.

Figure 21: Sample of MRF Blended Values in the U.S., Oct 2019

Commodity	Percentage of Outbound Materials	Price	Blended Value
Cardboard	19.5%	\$42.31	\$8.26
Mixed paper*	37.5%	\$5.65	\$2.12
Aseptics & Cartons	0.1%	\$9.00	\$0.01
Aluminum cans	1.3%	\$1,002.28	\$12.94
Steel cans	1.8%	\$77.58	\$1.38
Glass	18.8%	-\$10.27	-\$1.93
PET	3.9%	\$228.83	\$8.97
HDPE Natural	0.9%	\$893.10	\$8.34
HDPE Colored	1.0%	\$297.32	\$2.93
#3-7 Plastics*	1.1%	\$24.27	\$0.26
Mixed Rigid Plastics	0.4%	\$24.27	\$0.09
Residue	13.7%	-\$51.62	-\$7.07
Total	100%		\$36.30

* Two of the MRFs reported marketing newspaper (ONP) grades at an average market value of \$11.6 per ton and one MRF reported separating and marketing polypropylene at \$170 per ton. These numbers underscore the variability in sorting strategies by MRFs and consequences for blended values.

In a separate, ongoing research project, the Northeast Recycling Coalition (NERC) has been gathering data on MRF material profiles and blended values. The facilities surveyed by NERC are publicly owned or operated, with the data summarized quarterly. For the period of July through September 2019, the average commodity value with residuals was \$34.85 per ton.¹⁸

As shown in the data earlier, it is clear that material values are presenting MRFs with severe challenges to profitability. What has been the impact to MRFs relative to the cost of material processing? The NERC study indicates that processing costs across the 15 public MRFs it surveyed was \$83 per ton through the period of July – September 2019. The Recycling Partnership's survey of MRFs indicates average processing costs of \$82 per ton. While the calculation of processing costs is complex and sensitive, involving a range of factors, this data indicates \$80 per ton is a good baseline estimate, while recognizing that each MRF is unique and may experience lower or higher costs. Compared then to currently blended values, this leaves many facilities \$50 or more per ton under what it takes to keep their doors open.

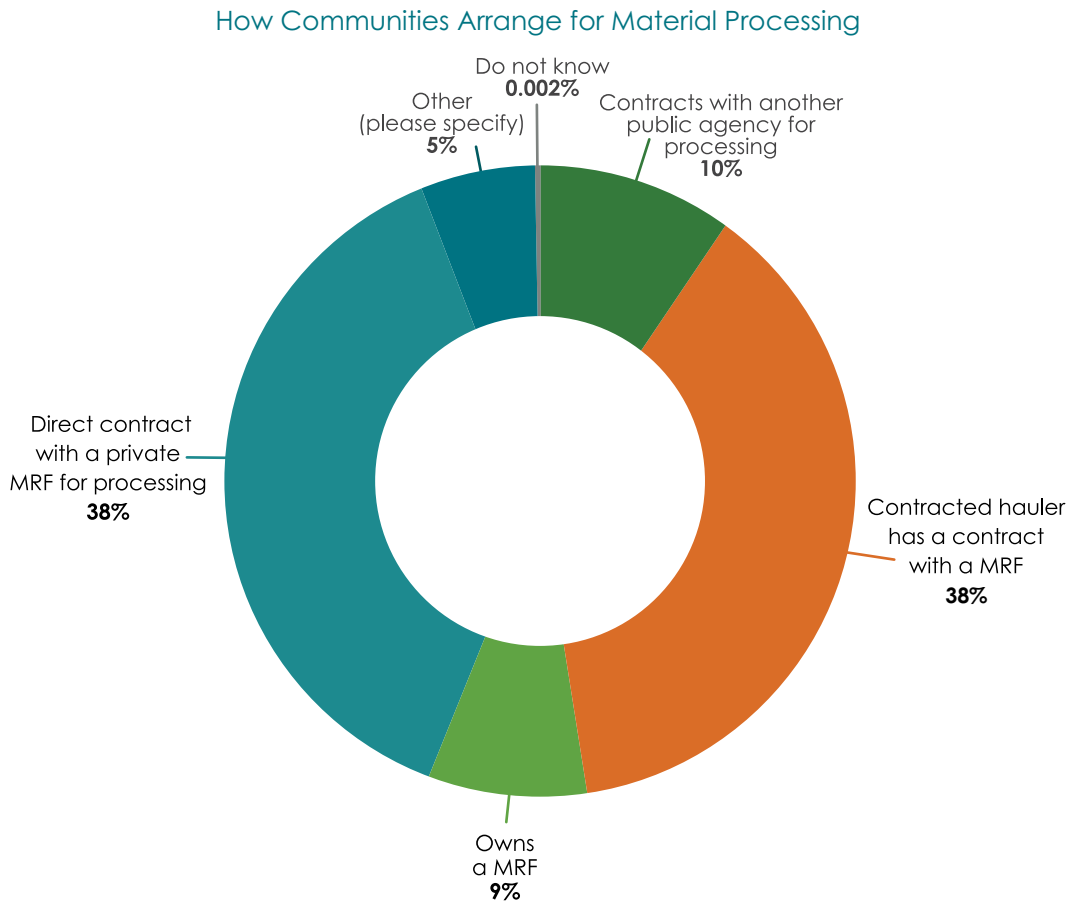
¹⁸ A factor to keep in mind for the NERC data is that the percentage of some materials, in particular PET and aluminum, may be somewhat lower because of the concentration of deposit states in the region.

MRF Profitability Issues: Effects on Community Recycling Programs

How is this affecting community recycling programs? When MRFs cannot make enough money through materials sales, they rely on processing charges to achieve profitability. Data from The Recycling Partnership's 2019 State of Curbside Survey provides a snapshot of current transactional relationships between communities and their recycling processors. Because each MRF contract can be unique and complex, the Survey allowed respondents to provide additional information in an open-ended format.

Figure 22 shows the breakdown of contracting scenarios reported by survey respondents. Of the 429 communities responding about material processing, 57 percent of communities are directly involved in the processing of their community's recycling through owning a public MRF, contracting with another public agency such as an authority, or contracting with a privately-operated MRF.

Figure 22: MRF Contract Status for The Recycling Partnership's 2019 State of Curbside Survey Respondents



When asked if the MRF charges the community processing fees, 196 out of the 429 responses or 46 percent responded yes. A total of 162 provided specific processing fee data ranging from the lowest fee of \$5 per ton to the largest \$180 per ton. The average report per ton processing fee is \$63.69 and the median fee is \$61.55 per ton.¹⁹

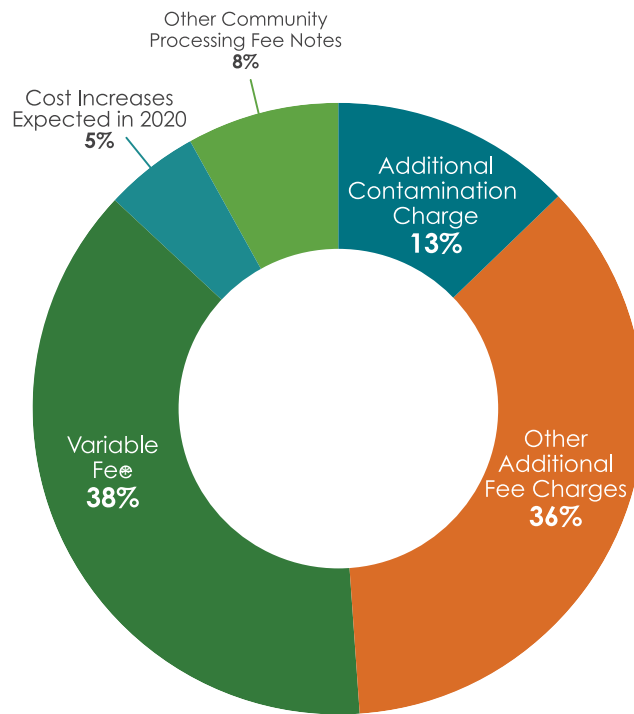
¹⁹ The processing fee data included one extreme outlier quoting a number of \$900/ton, which was excluded for purposes of the analysis.

Figure 23: Average Processing Fees for The Recycling Partnership's 2019 State of Curbside Survey Respondents

Processing Fees	\$/Ton
Average	\$63.69
Median	\$61.55

Figure 23 shows how MRFs are closing the gap between blended values and processing costs with charges to local programs. If the \$64 processing fees is applied to the total estimated 11.9 million tons of collected curbside material, the financial impact to collection programs is \$762 million per year. In some cases, additional fees may apply beyond the MRF processing fees or communities may experience variable charges as documented in answers from 39 survey respondents in Figure 24.²⁰ These charges can be difficult to quantify, but further indicate the complexity of recycling processing contracts. As an example of extra costs, five communities indicated being charged an additional fee for contaminated loads with three of those communities reporting charges of \$62.50, \$75, and \$225 per ton.

Figure 24: Additional Processing Fee Data from The Recycling Partnership's 2019 State of Curbside Survey Respondents



*charges vary based on a range of factors

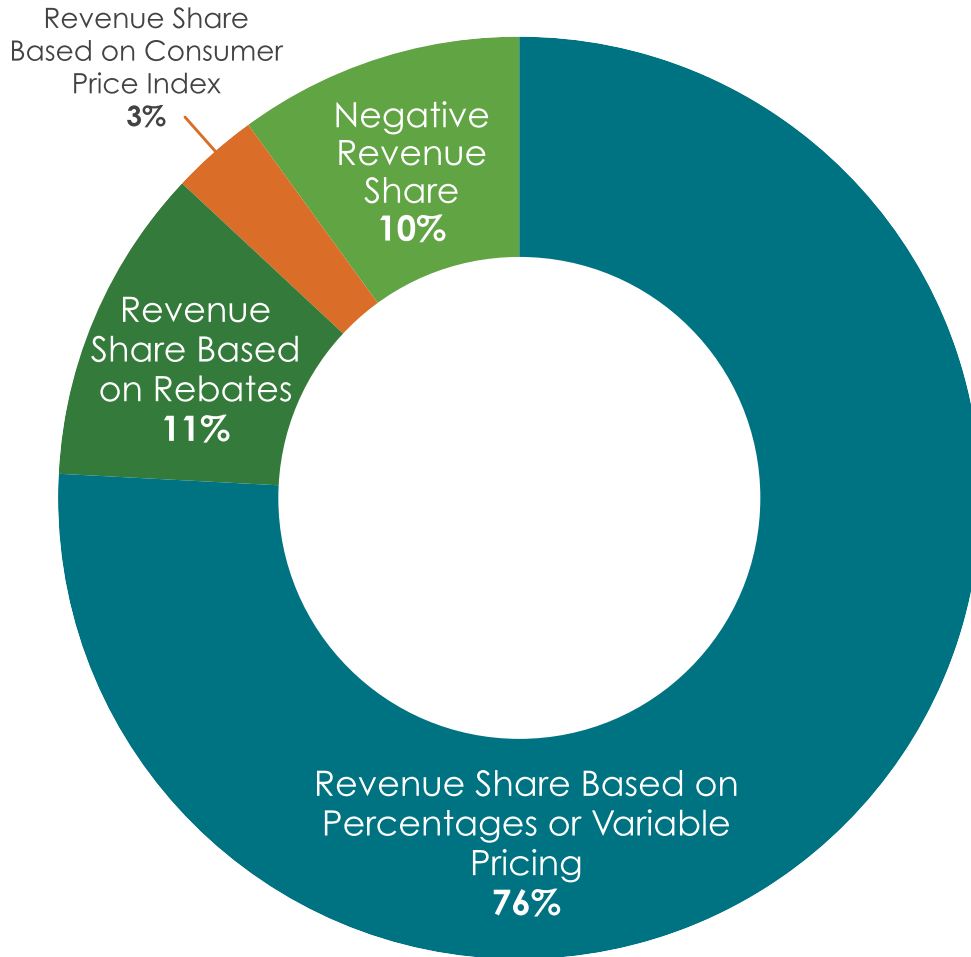
The status of MRF and community contracts around the country is fluid and changing, with more adjustments for more communities expected in the coming years. Of The Recycling Partnership's 2019 State of Curbside Survey respondents, 121 communities indicated that processing fees increased in the past year. 70 of those respondents shared specific information on those increases, ranging from the smallest of value of \$0.67 per ton to the largest increase of \$120 per ton. The average processing fee increase is \$28.74 per ton and the median fee increase is \$20 per ton.²¹ As a possible sign of an ongoing trend, eight communities indicated that they did not have a tip fee until 2018-19 and five communities previously received a rebate or reimbursement for recyclables, but do not any longer.

²⁰ Other charges in excess of tipping fees that impact the total cost per ton include: transportation, maintenance and MRF repairs, debt sharing, lost revenues, commodity market surcharge, hauling, residuals fee, minimum tonnage guarantees, consumer price index (CPI) adjustments, contract-based, and host community charges.

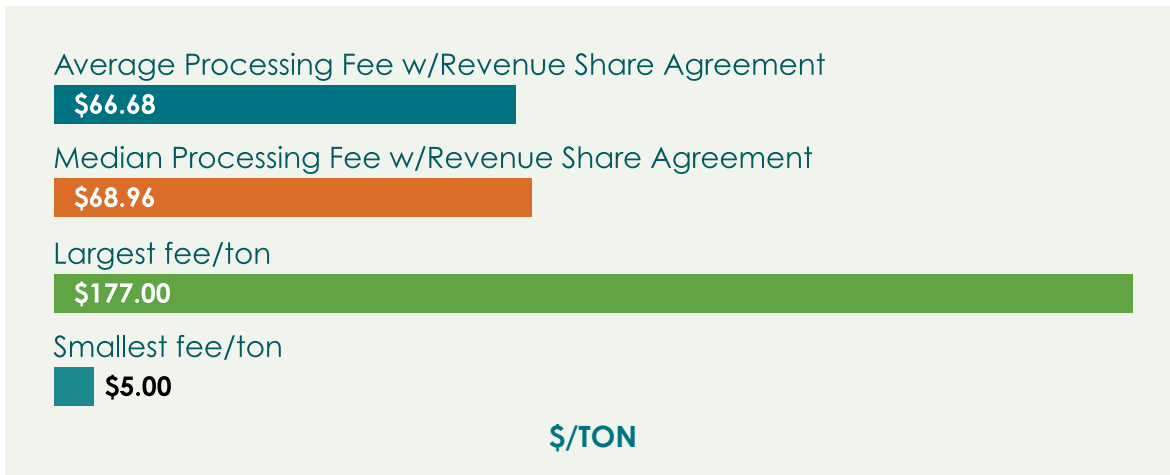
²¹ This data excludes one extreme increase of more than \$700/ton

Processing fees can be partially offset through revenue-sharing arrangements in MRF contracts, in which MRFs and communities agree on a specific split of the proceeds from material sales. A total of 90 communities responded that their community has a revenue sharing agreement, with 62 communities providing revenue sharing agreement details, as shown in Figure 25. The majority of the communities receive a percentage ranging from 40 to 100 percent of the recycling commodity revenue. A small minority report having negative revenue sharing agreements with their MRFs, in which communities pay the difference if material values are lower than the processing fees charged.

Figure 25: Revenue Sharing Data from The Recycling Partnership's 2019 State of Curbside Survey Respondents



Slicing the data a slightly different way, of 90 communities with MRF revenue sharing agreements, 86 also provided processing fee data at an average \$66.68 per ton and median fee of \$68.96 per ton. Figure 26 summarizes the aggregated processing fee data for communities with revenue sharing agreements.

Figure 26: Community Processing Fees with Revenue Share Agreements

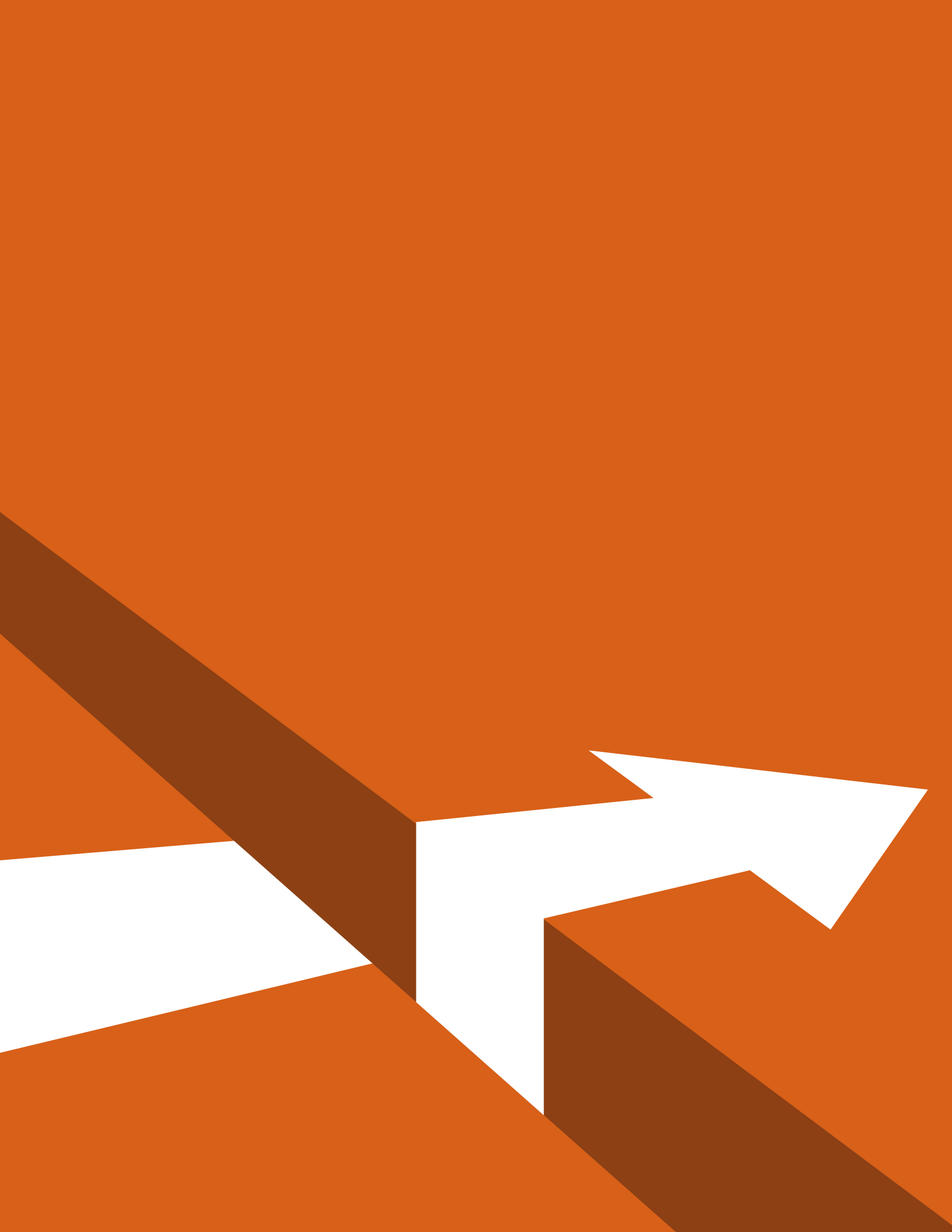
The Recycling Partnership's West Coast Contamination Initiative research work project provides additional limited amount of data on processing charges and revenue sharing. The four California communities not already represented in The Recycling Partnership's 2019 State of Curbside Survey data reported an average processing fee of \$71 per ton.

The Recycling Partnership has also been tracking published reports and articles from local or regional newspapers or news websites on processing fees since the fall of 2018. For the 22 stories tracked to date, the average processing fee quoted has been \$91 per ton.

As further insight, three organizations in New York state representing both public and private sector solid waste professionals have conducted surveys to underscore the increasing financial impacts of MRF processing charges on community programs. The fall 2019 statewide survey of local recycling managers in areas outside of New York City reported an average projected net MRF processing cost of \$74 per ton for 2020. The survey represented 70 percent of the estimated 800,000 tons of curbside residential recyclable materials generated annually outside of New York City, and indicated an estimated overall net MRF processing cost of nearly \$60 million in 2020, up from an estimated \$40 million from a similar study just one year before.²²

In summary, the data in this chapter points to the singular fact that curbside programs can now expect MRF processing charges to be a normal and expected cost in providing curbside services, placing a further cost burden on local communities.

²² Data from email exchange with Andrew Radin, Director of Recycling and Waste Reduction, Onondaga County, NY, Resource Recovery Agency. The three organizations involved in the survey were: New York State Association for Reduction, Reuse, and Recycling, SWANA New York Chapter, and New York State Association for Solid Waste Management.



Chapter 4:

How Community Programs Are Responding to New Challenges

The market conditions that created the need for processing charges from MRFs to communities are not expected to abate soon, leaving MRFs and communities with a “new normal” of tough curbside recycling economics. Publicly operated curbside programs are navigating these conditions in various ways, needing to come up with new funding to pay processing fees while at the same time hoping that political and public will supports retaining curbside services.

As of November 2019, it appears that the vast majority programs are finding ways to sustain curbside collection, with very few eliminating curbside services. This trend will have to be watched closely as hundreds of previously favorable MRF contracts will be reset in the next few years. Some communities are also adjusting materials collected for recycling, raising customer fees, and more positively, also taking steps to address contamination.

Program Elimination

In limited cases around the country, communities have reacted to market issues by eliminating curbside services. The Recycling Partnership began tracking media stories on changes to curbside programs in early 2018 to gather data on this issue. Vetted review of published instances from local and regional newspapers and news websites indicates that as of late November 2019, a total of 54 communities ceased curbside recycling service, certainly less than the “hundreds of programs” reported in some media stories.²³ The average size of households that lost access to recycling is 8,906 per community. About 70 percent of the communities affected were under 5,000 households. The average is brought up by relatively large communities like Jackson, Miss. (59,219 homes) and Sierra Vista, Ariz. (43,585 homes). A list of all communities found to have dropped curbside programs can be found in Appendix B.

In total, the estimated reduction in curbside recycling access across all the affected communities is 480,906 households, or 0.5 percent of all single-family homes in the U.S. and 0.7 percent of the 69.8 million U.S. households with curbside service. **A loss of only one percent of access to curbside recycling service is a sign of resiliency, but program elimination remains a threat to curbside service in the U.S., especially as MRF contracts continue to renew and as negative value blended values persist.**

Adjustments to Collected Materials

In facing a challenging recyclables market, some programs have made the difficult decision to remove items from their accepted materials list. With a smattering of these changes making the news, it can be difficult to understand if the changes to community recycling programs have been common or widespread. The Recycling Partnership's 2019 State of Curbside Survey found that roughly one-third of surveyed programs made changes to the list of materials they collect or accept in the past two years. Twenty-nine percent of programs have removed items from accepted lists and 3 percent have actually added materials.

Communities have removed a variety of materials from their recycling programs. The most commonly removed material has been plastics (primarily #3-7), cartons/aseptic containers, and film/plastic bags. Added materials included primarily cartons, glass, plastics (primarily #3-7), and pizza boxes. The changes made to recycling programs' accepted materials lists were analyzed for geographic trends with no significant findings.

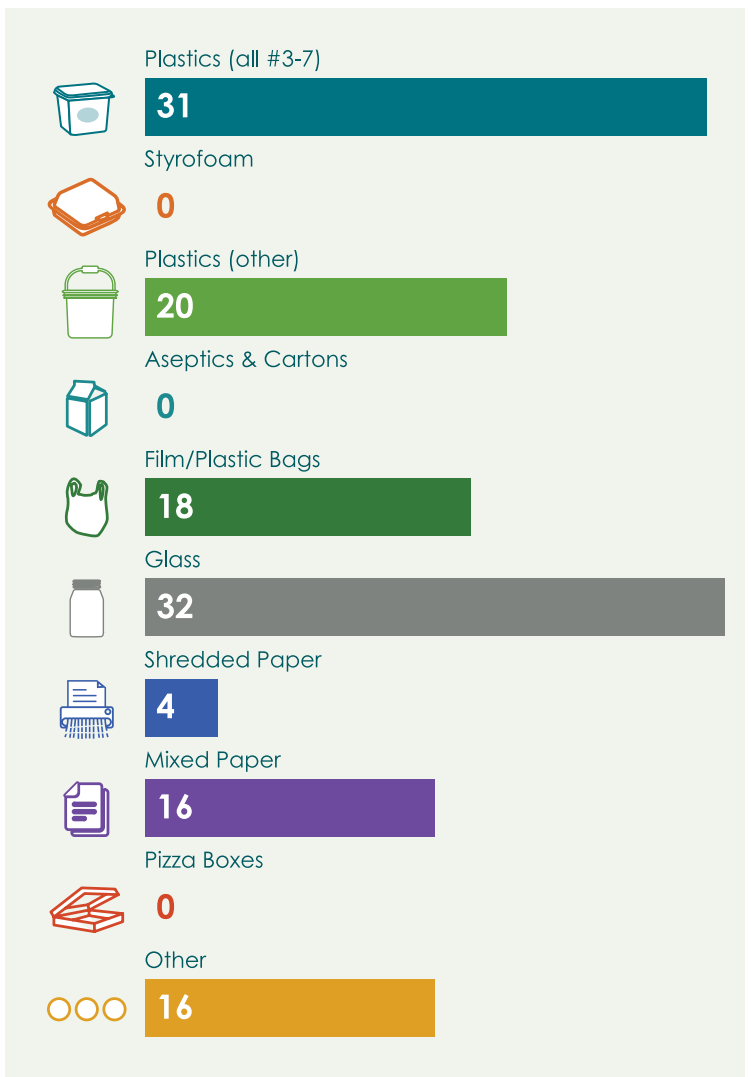
²³ <https://www.nytimes.com/2019/03/16/business/local-recycling-costs.html>

Figure 27 below contains further information on the number of surveyed communities that removed the listed items from their accepted material lists.

Figure 27: Specific Materials Eliminated in Curbside Collection Programs by Type



Figure 28: Materials Eliminated as noted in Media Stories, February 2018 – November 2019



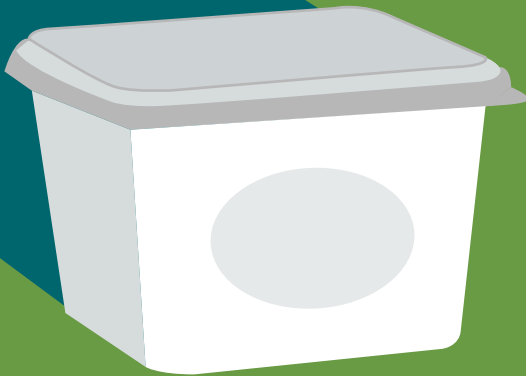
Of all the communities responding to The Recycling Partnership's 2019 State of Curbside Survey that removed items from their accepted materials list in the past two years, the majority (63 percent) only removed one item, while 37 percent removed two or more materials.

In addition to The Recycling Partnership's 2019 State of Curbside Survey, The Recycling Partnership has been tracking media stories on the removing of material in curbside programs. Figure 28 shows the data from these stories, using the same material categories as The Recycling Partnership's 2019 State of Curbside Survey data. As with the survey data, plastics #3-7 have seen some of the largest impacts, with glass slightly higher in the elimination from collection.

The Emergence of #3-7 and Polypropylene Domestic Markets

Although the resin mix #3 – 7 has been one of the hardest hit by Chinese export market issues, a domestic North American industry appears to be rapidly developing to provide economic outlets for this material. Companies such as Buckeye Polymers and EFS are actively seeking supply streams of #3-7 plastics, providing new demand to stem the elimination of these materials from collection programs. Some elements of the emerging chemical recycling industry, such as Brightmark Energy and Nexus Fuels, may also offer viable domestic outlets for a range of curbside collected plastics materials beyond PET (#1) and HDPE (#2) bottles.

The main target resin in #3-7 processing is polypropylene (PP), which is also seeing more significant domestic demand as a separated material. A growing number of MRFs are dedicating optical sortation to polypropylene separation, indicating a trend that could cement the material as a core recyclable in curbside collection mixes. Support from brand owners, manufacturers, resin suppliers, retailers, and others for the development of processing and market demand could accelerate this trend. In 2020, The Recycling Partnership will launch a Polypropylene Industry Council to increase the capture of PP and ensure its status as a standard curbside recyclable material nationwide.



Adjusting Fees

To absorb the costs of low market values and associated MRF processing charges, some communities have adjusted the service fees charged to households. Increasing fees is an act of political will by a community's elected leadership. An example of a city where that political will resulted in the retention of a program is Little Rock, Ark., where the city's leadership agreed to increase the local recycling service fee from \$2.99 to \$4.29 per month, albeit while also eliminating glass from the collection programs.²⁴

The Little Rock, Ark. increase, amounting to \$15.60 per customer per year is in line with data The Recycling Partnership has been collecting from media stories on fee increases since the summer of 2018. For the 24 stories in which specific fee increases were quoted, communities were increasing fees, on average, \$17.52 per customer per year.

The Recycling Partnership's 2019 State of Curbside Survey requested information on the issue of raising fees.

A surprisingly low number, only eight percent of respondents, answered that they had raised fees, with the average annualized amount for those that provided specific answers at \$10.12 per household.

Limited data from The Recycling Partnership's West Coast Contamination Initiative research found that one Washington and three Oregon communities reported raising fees an average of \$24 per household per year.

In all, the increases to local fees seem to be modest and in line with processing fee increases: e.g., if a household sets out 400 pounds of recyclables per year, or one-fifth of a ton, a \$15 increase on its recycling fee is equal to \$75 per ton. In the disaggregated nature of the U.S. curbside recycling services, the effect of large processing charges and weak markets have forced individual communities around the country to debate the value of recycling, all while dramatic media narratives report a recycling crisis. Under those conditions, it is a positive sign that communities are working hard to sustain or expand their curbside services.

²⁴ <https://www.arkansasonline.com/news/2018/oct/02/lr-says-yes-to-recycle-changes-20181002/>

Reliance on Local Commitment to Curbside Recycling

The U.S. curbside recycling system was built around a legacy of assigning local governments the role of managing discarded materials from households. What began as an obligation to pick up “municipal solid waste” transitioned into a system in which communities were also asked to collect

materials identified as commodities separately and to start the process of bringing them back into economic use. From the data presented in this report, it is clear that this system is both underachieving and challenged, but also that there are compelling reasons and opportunities for the system to improve. Chapter 5 presents strategies for addressing the challenges and making use of the opportunities for local curbside recycling programs.



Case Study

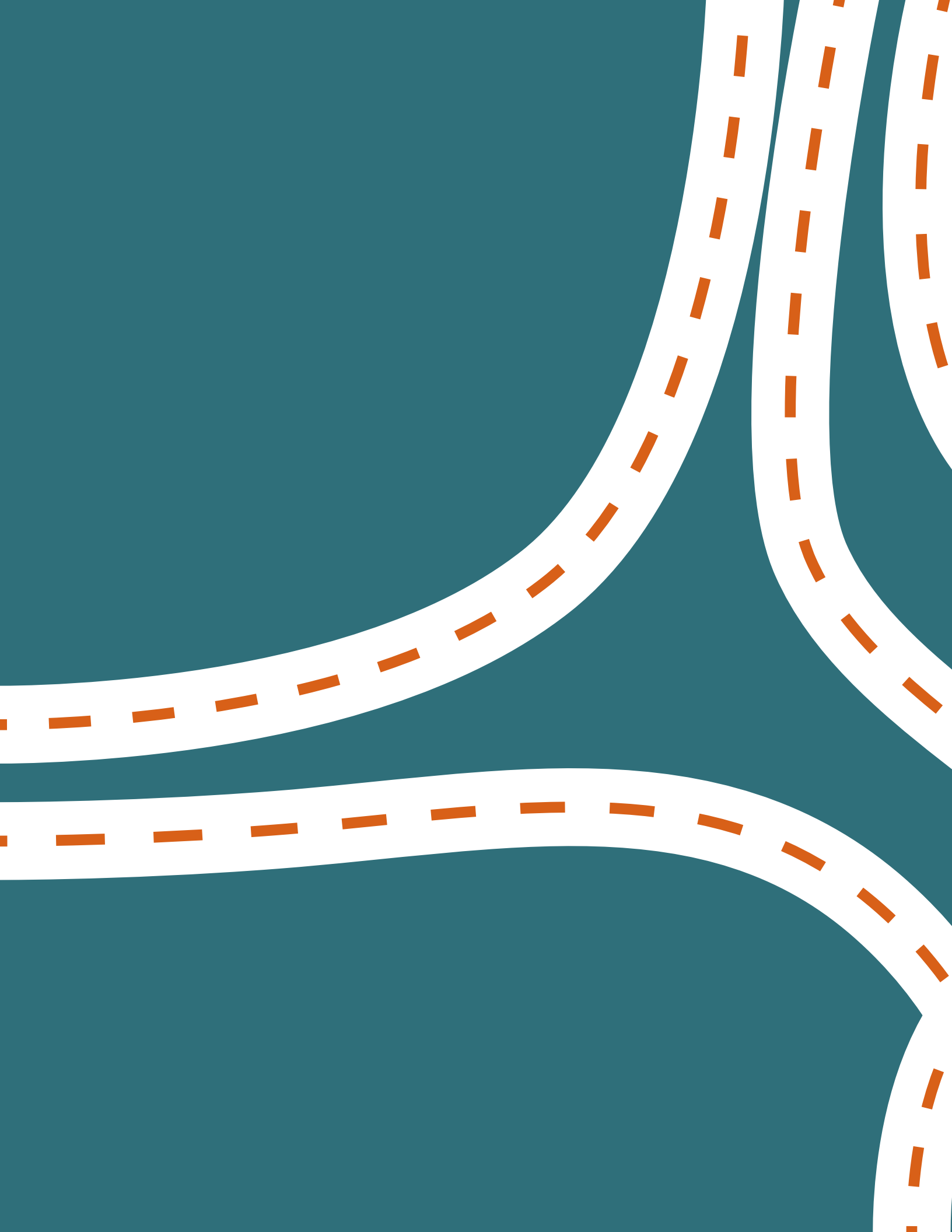
City of Iowa City stuffs cart packets to introduce residents to their new curbside recycling carts along with what can and can't be recycled.



All in On Recycling: Iowa City Celebrates Early Grant Access

As a case in point, despite negative market conditions, Iowa City transitioned to 65 gallon recycling carts for its curbside program in December 2018 with the help of a [grant from The Recycling Partnership](#) made possible through funding from the PepsiCo Foundation. In the first nine months of the transition, the city achieved a 30 percent jump in collected tonnage, averaging 60 more pounds per household on an annualized basis. The city found that the carts created an improved public recycling service, giving citizens ample storage for all of their recyclables in a convenient container. The new cart program is supported by robust public outreach to increase material capture and keep it clean. Iowa City isn't alone in these efforts.

Thanks to the efforts of The Recycling Partnerships' All In On Recycling, movements like these are sweeping cities across the nation. The All In On Recycling challenge, in conjunction with the PepsiCo Foundation, was started to make recycling easier for 25 million families across the country by providing communities with the resources they need to help citizens recycle more and recycle better. The movement can already be seen in 1,400 U.S. communities. Many curbside programs improved their services in 2019 in places as diverse as Sarasota, Florida, Red Wing, Minnesota, Reynoldsburg, Ohio, and Vineland, New Jersey.



CHAPTER 5:

Helping the U.S. Curbside Recycling System Thrive –

Mapping the Path Forward Toward Recycling 2.0

This report has been intended to provide a frank assessment of the state of curbside recycling in the U.S. and to identify ways to improve performance. The stakes are high. Beyond the clear need for recycling to contribute to climate change solutions, pending material market changes will demand capturing more household recyclables. Twenty-one new or refurbished domestic paper mills requiring recovered fiber will open between now and 2022 and \$3.3 billion has been invested to grow that market. Growing pressure on plastic packaging formats will dramatically increase market demand for post-consumer resin as documented in The Recycling Partnership's [Bridge to Circularity Report](#). Metal packaging manufacturers are anxious to ramp up supplies of recovered aluminum and steel cans, just as brand companies packaging in glass bottles and fiberglass manufacturers want to increase the use of clean recycled cullet.

Although what is presented here appears as individual strategies, none by themselves will produce dramatic system change. The strategies all complement each other and should be viewed as an integrated portfolio of impactful action.

The commitments of brand companies and material sectors to more recycled demand come at a time when the supply is most under stress – a time when many elected officials, pundits, and critics have questioned the value of curbside recycling. This chapter presents a range of strategies and actions to help not only meet the current challenges, but also build Recycling 2.0 – a more resilient curbside system that performs consistently better over time. Although what is presented here appears as individual strategies, none by themselves will produce dramatic system change. The strategies all complement each other and should be viewed as an integrated portfolio of impactful action.

Recognizing and Encouraging Citizen Demand for Curbside Recycling in the U.S.

The general public, despite being fed a steady stream of confusing information and pessimistic signals about recycling, seem to be steadfast in its commitment to recycling. Data on public attitudes on this question can be rare, but there are some indicators that the public values recycling and will react negatively to a potential loss of service. As one example, in February 2019 as Norfolk, Virginia weighed whether to keep its curbside program in the face of processing challenges, the City conducted a [survey](#) that showed only 13 percent of respondents were not willing to pay more to retain the service.

A 2019 The Recycling Partnership [Survey](#) also documents that Americans see recycling as very important.²⁵ A total of 84 percent of respondents view recycling as a valuable public service and are supportive of taxes to improve U.S. curbside recycling services.

Figure 29:
Public Support of Recycling

Percentage of Americans Saying Recycling is as Valuable a Public Service as Waste and Water

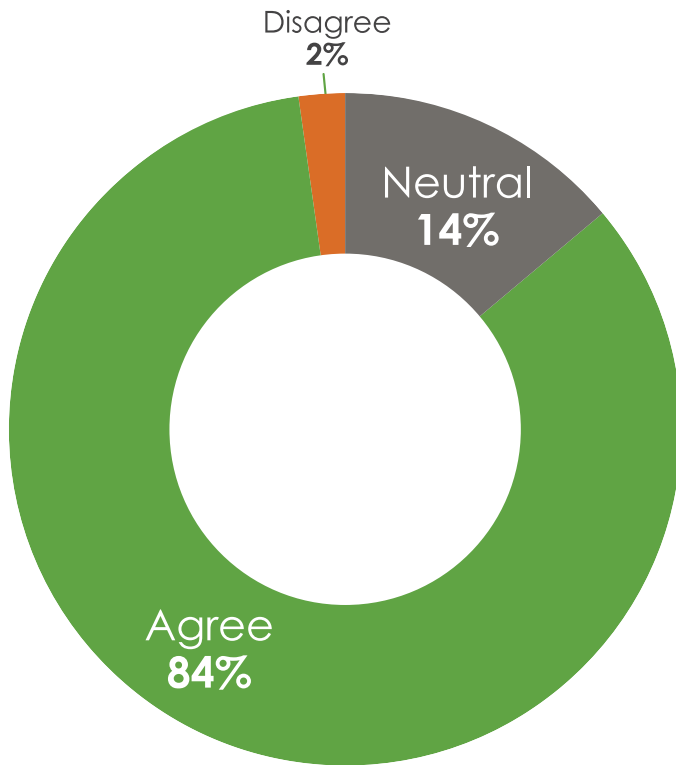
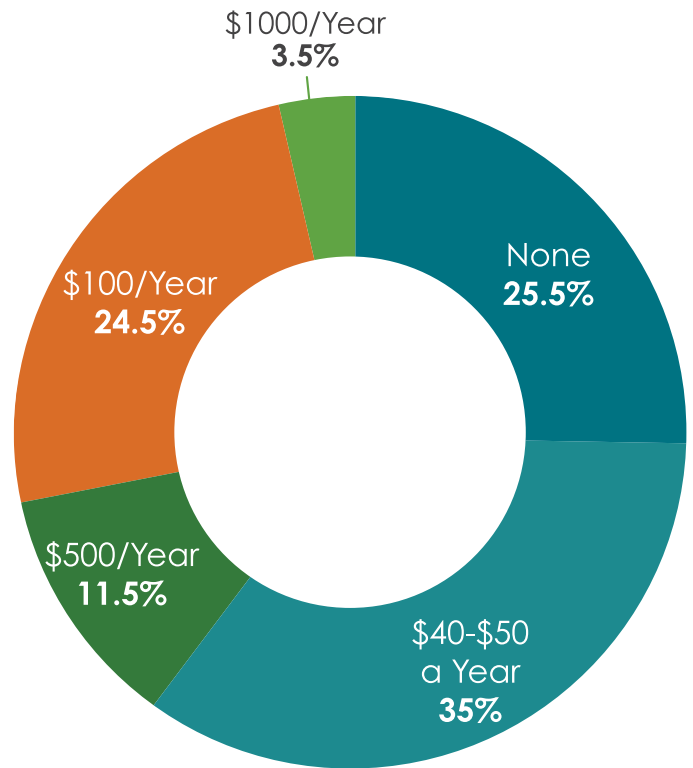


Figure 29b:
Willing to Pay More Taxes for Better Recycling

Americans are Willing to Pay More Taxes for Better Recycling



It is clear that citizens see recycling as a vital public service and one they expect to receive. Additional and consistent action should be taken to document public commitment to recycling and to use the data to grow that commitment and solidify support for curbside services. Brand and material sector companies can contribute to both understanding and encouraging of this commitment.

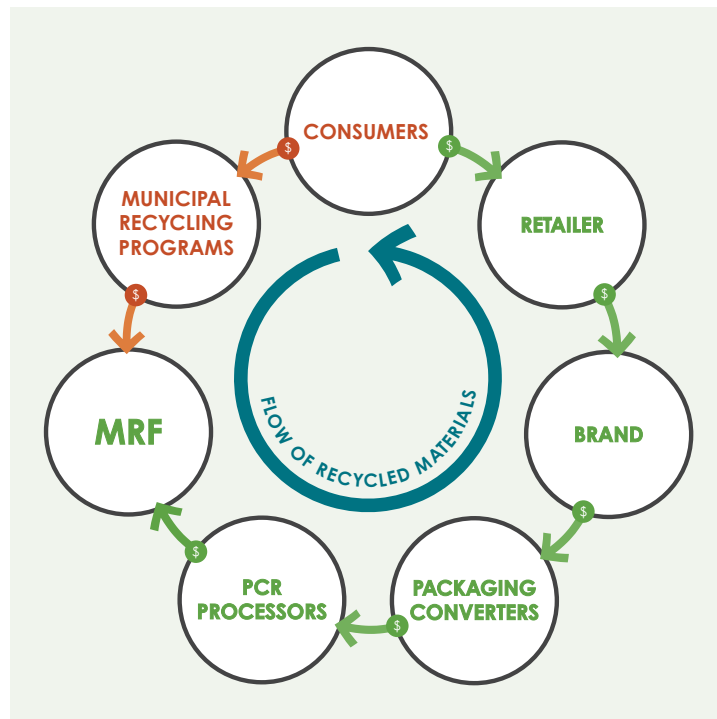
²⁵ <https://recyclingpartnership.org/download/30257/>

Supporting Local Official Commitment to Recycling

In the current U.S. recycling system, the responsibility of curbside recycling service rests with local governments. Communities from small towns to huge cities and rural to urban communities decide the strength and breadth of the curbside recycling in the U.S. Its disaggregated and unharmonized nature rests on local political will in which thousands of mayors, council members, commissioners, and their staff weigh the priorities of their communities and decide whether – or not – to offer curbside recycling service to their citizens, determining also the nature of that service (frequency of collection, type of container used, etc.). These elected officials and local governments know that in order to offer curbside recycling services they will need to impose a fee or tax on their citizens to support this effort.

This graphic from The Recycling Partnership's [Bridge to Circularity](#) report shows the general structure of transactional financing in curbside recycling in the U.S. Although specific to the plastics recycling values chain, the points listed in Figure 30 can be interchanged with similar kinds of stakeholders in paper, metal, and glass value chains, indicating the core basis of tax-based system financing borne by local communities.

Figure 30: Value in the Flow of Materials in the Curbside System Report



The scenarios of decision-making on recycling services are played out in budget cycles across the U.S. every year. Sometimes sudden cost increases must be addressed after budgets have been set, bringing the choice about curbside service back into local public decision-making. The case of Chesapeake, Virginia offers an example. In late 2019, as the city was hit by higher MRF processing charges, it found itself weighing the pros and cons of passing on increased costs to its citizens. The city's deliberations were captured in a quote from Eric Martin, the city's public works director: "Do we really need recycling? That's maybe a nice-to-have rather than a need-to-have, given the cost. That's where I think the community discussion has to go ... How much value do you place on recycling?"²⁶

Stakeholders across the system need to help cities like Chesapeake be confident and feel supported in choosing to retain curbside services, deploying financing and policy interventions that achieve that objective. Providing communities access to substantial external capital for program improvements is a minimal first step.

²⁶ https://www.pilotonline.com/government/local/vp-nw-chesapeake-recycling-ffc-20191028-j3te53zw2fh23jwbkjaiaut2m-story.html?utm_source=Sailthru&utm_medium=email&utm_campaign=Issue:%202019-10-29%20Waste%20Dive%20Newsletter%20%5Bissue:23827%5D&utm_term=Waste%20Dive

Providing Critical Capital

While communities across the country wrestle with absorbing higher operational costs related to market changes, the deployment of strategically applied capital can build access and efficiency for the future of curbside collection. On a very broad level, The Recycling Partnership has estimated a capitalization need for carts, trucks, and improvements to MRF processing infrastructure in the range of \$2.4 billion in order to accomplish widespread systematic change. Clearly this level of capital cannot be raised overnight, but a substantial installment toward that goal could jump start the adoption of more efficient material collection.

To some degree, some of this capital could come from communities motivated to improve their curbside services. However, increased operational costs caused by negative market conditions diminish that motivation. **To move the curbside recycling forward to a next generation 2.0 program, external capital sources could help communities with at least half of capital costs to improve their programs in exchange for communities continuing to bear the operational costs of collection. The Recycling Partnership's [Bridge to Circularity report](#) proposes a one-to-one shared investment model at an initial scale of \$250 million over five years that would increase overall curbside tonnage across all materials by almost 938,000 tons, while also ramping up material collection in multifamily settings.**

Figure 31: Proposed Capital Funding Model, Uses, and Expected Outcomes

Intervention	New Tonnage Collected (in Thousands)										
	Households Reached (in millions)	Industry Investment (in USD millions)	PET	HDPE	PP	Cardboard	Residential Mixed Paper	Glass	Aluminum	Steel	TOTAL
Conversion from Bins to Carts	4	\$104	15	7.2	4.8	36	96	48	3.6	4.8	215.4
Optimization of recycling behavior in curbside programs	7	\$28	13	2.7	1.8	31.5	84	42	3.2	4.2	182.4
New curbside access	3	\$78	37	18	12	90	240	120	9	12	538
Sub-Totals for Curbside Interventions	14	\$210	67	27.9	18.6	157.5	420	210	15.8	21	937.8
New multifamily recycling access	4	\$40	37	15	9	90	240	120	9	12	
Total	18 million households	\$250 million	102	42.9	27.6	247.5	660	330	24.8	33	

The timely and aggressive application of industry-provided capital funding would send a signal to local elected officials that they are not alone in their efforts to operate a healthy curbside recycling program, increasing the necessary political will to make necessary investments.

Improving Collection Efficiency

Cart-based collection provides the most efficient method of delivering curbside recycling service, providing households with easy-to-handle, large-volume storage for an increasingly voluminous material collection mix, while also offering collection workers the safest way to gather curbside materials. As shown in Chapter 2, survey data on community programs find that cart-based collection outperforms all other forms of collection by 100 pounds per household.

This finding is further validated by The Recycling Partnership's efforts to transform curbside recycling through cart grant funding. To date, the cart grant program has provided grants to 52 individual municipalities across the U.S. After switching from bins to carts, there was an average increase of 102.36 pounds per household collected.²⁷

Funding for Local Curbside Programs

The Recycling Partnership offers a flexible grant program to support curbside recycling in communities of all sizes across the U.S. It allows communities to apply for funding to convert bin or bag based curbside recycling programs to carts or to implement new cart-based curbside recycling programs. Applications for funding are accepted on an ongoing basis, and communities that receive funding for carts are offered financial and technical assistance in support of recycling education and outreach. More information on the grant program is found in our [Request For Proposals](#).

Improvements to access and the development of a more effective collection programs will deliver scaled increases to material capture. However, this is a highly incremental process conducted municipality by municipality. While there are hundreds of low performance bin-based, bag-based, and under-utilized subscription programs across the country, the largest incremental steps toward better performance will happen in big cities increasing capacity and access.

²⁷ Analysis produced from grant reports provided by recipients of The Recycling Partnership's cart grants.

Focusing on Large Cities

Where are those large opportunities and what kind of contribution can they make toward material supply? Figure 32 shows 12 large U.S. cities where changes to access and service provision could yield some of the highest, single-city jumps in material recovery, affecting 1.62 million total households. It would require program improvements in more than 160 cities of 10,000 households (roughly 26,000 population each) to have the same effect.

Figure 32: Large City Opportunities to Improve Material Collection

City	Program Status	Improved Program	# of Curbside (Single Family) HHs	Projected Increase in Curbside Annual Tonnage
Baltimore, MD*	Bin-based collection	Cart-based collection	210,000	19,866
Birmingham, AL	Bin-based collection	Cart-based collection	61,369	8,568
Detroit, MI**	Partial usage of carts; opt-in program serving only 30% of households	Addition of 16,000 HHs to cart-base collection	207,000	1,200
Indianapolis, IN	Opt-in curbside program serving only 10% of households	Universal curbside services	267,000	42,700
Jackson, MS	Suspended program in 2019	Restart curbside program using city-wide cart-based collection	50,300	8,175
Kansas City, MO	Bin-based collection	Cart-based collection	148,500	11,710
Milwaukee, WI*	Variable collection cycles across city; 18,600 households still in bins	Universal cart-based, every-other-week service	181,133	13,040
Mobile, AL	No curbside program	Startup of new curbside program	60,100	9,800
Nashville, TN**	Once/month collection using carts	Every-other-week collection	139,000	7,900
Omaha, NE*	Bin-based curbside collection	Cart-based collection	145,000	9,912
Pittsburgh, PA**	Bag-based collection with isolated voluntary adoption of bins and small carts	Addition of recycling containers to 35,000 HHs	115,630	1,826
Syracuse, NY	Bin-based collection	Cart-based collection	40,000	2,771

* Indicates that as of December 2019, the City has been offered grant funding by The Recycling Partnership;

** indicates the City has received additional funding from a State recycling grant program.

An aggressive strategy to bring large cities into efficient curbside programs requires the provision of adequate levels of capital discussed in the previous section. Again, recognizing that cities can anticipate high operational costs in their curbside programs, a higher level of capital intervention will be the key to motivating municipal action.

Addressing the Pace of Local Program Change

Local curbside programs that seek to improve their curbside collection services must conduct processes that include budget proposals, elected official approvals, service or equipment bidding and procurement, hauling contract adjustments, educational outreach preparation, and actual cart deployment. These processes, from concept to the original budget proposals through deployment, typically take multiple years to complete and greatly affect the pace of program change. Figure 33 shows examples of U.S. cities that are in the process of taking important steps to improve their curbside services and their implementation timeline. This kind of information is critical in understanding how quickly change that relies on local decision making can be delivered.

Figure 33: Timelines of Sample City Program Change

Community	Beginning Step (starting from The Recycling Partnership involvement)	Beginning Step Timing	Actual or Anticipated Implementation of Program Change	Time for Expected Program Change	Obstacles to Overcome
Chattanooga, TN	Offer of assistance and funding from State of Tennessee and The Recycling Partnership	February 2018	September 2020	2.75 years	City concern with operational costs and contamination when providing universal curbside services; material processing procurement; need to conduct audit to determine number of carts needed
Indianapolis, IN	Adoption of Thrive Indianapolis Sustainability Action Plan; outreach to City to support adoption of universal curbside services	December 2018	2024 or 2025	5+ years	Existing waste, recycling and labor contracts with long terms; competition for staff time with other sustainability initiatives; need for substantial capital investment in collection infrastructure
Milwaukee, WI	Introduction to municipal staff; offer of financial assistance for system intervention	May 2018	September 2020	2.3 years	State legislated constraints in raising funds through property taxes; competition for financial resources in a local budget; need for consulting services to analyze system finances
Nashville, TN	Development of initial budget and plan to convert from monthly to every-other-week collection	January 2018	September 2020	2.75 years	Truck procurement, increased collection staffing, increased cost of processing, stresses to general fund budget
Omaha, NE	Outreach to municipal staff, introduction of flexibility in how much municipality will procure recycling carts	August 2018	December 2020	2.3 years	Challenging procurement of collection and processing services; substantial cost increase for materials processing

Curbside system stakeholders can expedite public action on curbside recycling through increased engagement of municipal elected officials and, as discussed earlier, raising the level of outside capital interventions to at least half of what communities need for program expansions or improvements. Practical steps to develop standardized bid and proposal documents and staff training that facilitates faster procurement processes could also accelerate city action.

Addressing Curbside Recycling Deserts

The 2016 SPC Access Study found that six percent of Americans had no access to any recycling services whatsoever, and another 21 percent of U.S. households could recycle only through drop-off services (specified locations in a community where materials can be dropped off to be recycled).²⁸ Although detailed analysis is needed to map all of the opportunities for new programs, it includes some American cities, such as Surprise, Arizona and Jackson, Mississippi, where access was eliminated.

One area of the U.S. that constitutes a true curbside recycling desert is north and west Texas. Due to its rural nature, recycling programs in the region have struggled to establish or sustain curbside programs, facing challenges that include a lack of processing capacity, low disposal tipping fees, substantial distance to market and now declining material values. Figure 34 shows the major cities in the region without curbside service, adding up to more than 815,000 people with limited access to recycling drop-off services.

Figure 34: North and West Texas Cities with No Curbside Program

City	Population Estimate	Access to Drop-off Recycling?
Lubbock	247,323	Yes, four permanent drop-off locations and 6 satellite locations
Amarillo	197,823	Yes, four drop-off locations
Midland	131,286	Yes, two drop-off locations
Abilene	122,762	Yes, limited recyclables at drop-off locations throughout the city
Odessa	115,930	Yes, 1 drop-off location
San Angelo	99,135	Yes, 1 drop-off location
Total	815,124	

For the U.S. curbside recycling system to achieve its full potential, the challenges of bringing curbside services to recycling deserts areas must be addressed. Strategies can include development of hub and spoke material transport systems and higher levels of external funding.

Moving Subscription and Opt-in Programs to Automatic, Universal Collection

As discussed in Chapter 1, more than 16.5 million U.S. households with opportunities to subscribe to curbside services fail to do so, in part due to cost barriers. Also discussed in Chapter 1, in Indianapolis, subscribers are required to pay \$99 per year to receive curbside service, enough of a disincentive to result in only 10 percent of households signing up. The City's Thrive Indianapolis plan, approved in early 2019, will move households toward automatically provided curbside service by 2025.²⁹

A 2019 study of recycling in the state of Colorado highlights the opportunities for addressing subscription issues.³⁰ A progressive environmental state by many measures, Colorado has a significant representation of open market and subscription-based curbside programs, with seven out of the state's 10 largest communities not providing automatic curbside service to all households. As a case in point, Colorado Springs, the state's second largest and the country's 41st largest city, does not provide formal organized curbside recycling, leaving 472,000 citizens with, as mentioned earlier, the option of paying an additional \$5.30 per month to receive curbside service. While not an insurmountable expense, it places a barrier to household participation in material recovery.

Addressing the shortfalls of subscription and opt-in programs in cities like Indianapolis and states like Colorado will be critical to improving the performance of curbside recycling services in the U.S.

²⁸ <https://sustainablepackaging.org/findings-released-spc-centralized-study-availability-recycling/>

²⁹ Thrive Indianapolis: <https://static1.squarespace.com/static/5b4ead40c3c16a711ae78401/t/5c704aa4fa0d6033019e373a/1550863041205/2019CPSR001-ThriveIndianapolis-web.pdf>

³⁰ http://ecocycle.org/files/pdfs/Campaigns/zero-waste-colorado/2019_State_of_Recycling_in_Colorado_Eco-Cycle_CoPIRG_web.pdf

Improving Household Capture Behavior

As discussed in a previous section, capture rate behavior among participating households is a factor needing attention in improving the performance of curbside recycling services in the U.S. Very few cities have taken steps to improve capture behavior beyond the ancillary capture increases that can occur in contamination initiatives such as the feet on the street program described in Chapter 2.

Projects conducted by The Recycling Partnership deploying a combination of cart tagging, social media, and additional educational outreach demonstrate how challenging this problem can be for communities. In three intensive, first-of-their-kind efforts to affect capture behavior in Denver's curbside program, The Recycling Partnership saw only marginal increases in participating household capture behavior. However, Denver is a relatively high performing curbside city and similar interventions in a lower performing city may yield even better results.

Much more attention and project work is needed on capture behavior, and will need to include better understanding of what motivates individual households to perform better, which messages resonate, and what might be happening within a household internal collection system that prevents high-capture behavior (e.g., the absence of collection bins in critical generation points inside the home).

Addressing Contamination

To reduce costs and improve efficiency of recycling programs, communities across the country have turned their attention to tackling contamination at the curb. While inbound contamination does not look exactly the same for every program, there are proven educational strategies that successfully teach proper recycling behaviors and reduce curbside contamination rates.

The Recycling Partnership endorses complementary strategies for educating residents as close to the recycling behavior as possible with direct feedback to improve material quality in a recycling program. Residential education alone is not enough to tackle contamination at the curb; curbside feedback through the use of cart inspection and tagging is crucial for reinforcing good recycling behaviors and informing residents about what they are doing wrong and right when recycling. In addition, good recycling behavior needs to be addressed in grocery stores, offices, and anywhere else that materials can be recycled through **clear, visible signage and the availability of recycling containers. By educating consumers and providing access to recycling where citizens live, work, buy, and play, we can significantly increase the amount of recyclable materials and reduce the amount of inbound contamination.**

Appendix D of this report shares strong evidence that direct engagement with citizens is effective in reducing curbside contamination. Resources, training, and tools to help more communities operate cart inspection, tagging, and rejection can help accelerate the adoption of these best management practices across the country. Curbside recycling services stakeholders should explore ways to scale the deployment of cart tagging and related strategies across the country.

Fostering Better MRFs and Better MRF Contracts

The fleet of MRFs in the U.S. is vastly diverse, with a wide spectrum of capacity and capability. But they are the critical link between a potentially growing supply of curbside-collected material and the evolving circular economy. While some MRFs have invested in the future through deployment of optical sorters, robotics, and paper and glass cleaning equipment, many more need extensive modernization to be able to function efficiently. Capital, technical assistance, and innovation at scale would ensure that the MRF infrastructure is up for the task of massively growing material recovery.

As MRFs improve, so must their transactional relationships with community recycling programs. As discussed in this report, the negative market issues of the last two years are being played out in bid and contract processes around the country, testing this critical symbiotic aspect within U.S. curbside recycling services. The Recycling Partnership will soon release a best management practices guidance document with recommendations designed to build healthy contracts that allow both community recycling programs and MRFs to grow and thrive. The Partnership will hold webinars and workshops available to municipalities across the country to educate on these best management practices and spread the word on how this imperative relationship can be improved.

Connecting Dots to Other Materials and Recognizing Circularity Challenges

Although the U.S. curbside recycling system needs substantial action to meet its potential, it is easy to forget that it is just one part of a much larger effort to address the loss of material to disposal in the U.S. and the related negative environmental impacts. Increasing capture opportunities for materials not accepted at the curb not only enhances the huge benefits of disposal diversion, but also complements efforts to address curbside contamination. Initiatives ranging from food waste collection to providing recycling opportunities for household batteries would help remove significant contaminants in curbside programs.

To that end, curbside recycling stakeholders should understand that curbside recycling does not exist in a materials management vacuum, and that their support and advocacy for broader recycling programs and services can benefit their interests in better curbside services.

Similarly, stakeholders should also support a new comprehensive recycling system in the U.S., Recycling 2.0, to achieve the broadest possible impacts of circularity. It must be recognized that some materials collected curbside find their next immediate use in products for which collection and recycling are underdeveloped or nonexistent.

Retaining Materials in the Collection Mix

Chapter 4 of this report provided data on erosion in the material collection mixes among some communities in the country. Turning off and on material streams leads to overall confusion and is often done without the benefit of a strong analysis or opportunities for communities to gather citizen input. While not necessarily widespread, it is a phenomenon that may persist in the currently challenging market and it reflects, in part, the need to upgrade MRF processing, as discussed earlier.

Although unsorted #3-7 plastic bales have been hit hard by Chinese export market issues, a domestic North American industry appears to be developing to provide economic outlets for this material. Over time, new demand, including emerging chemical recycling facilities, should ideally stem the elimination of these materials from collection. Similarly, with MRF and processing infrastructure development, polypropylene should increasingly become a core collected material in curbside programs.

For various reasons, including low market value, regional market weakness, and processing challenges, glass has also seen a steady trend toward elimination in curbside recycling programs. Some of this trend has been driven by pressure from hauling and processing companies on local recycling programs, either through ultimatums on glass acceptance or adjustments to service and processing charges that disincentivize the inclusion of glass. There is evidence, however, that glass can be successfully managed as a mainstream recyclable material and there is a strong correlation between the presence of glass processing equipment in regional MRFs and the continued acceptance of glass in curbside programs. Surveys by NERC and by Glass Recycling Coalition indicate, however, that there is still a gap in the deployment of glass processing in MRFs around the country.³¹ As with polypropylene, glass stakeholders should explore opportunities to foster investment in MRF equipment to help ensure glass stays in the curbside mix.

Adjusting to New Materials

It is clear that consumer packaging will continue to change and impact curbside recycling collection. Emerging packaging formats, such as the example of film and flexible plastic packaging, should ideally be moving toward the status of a mainstream recyclable material. For that to occur, the Pathway to Circularity would include some basic essential steps, which follow the [Navigating the Recycling System matrix](#) developed as part of our [ASTRX](#) collaboration with the Sustainable Packaging Coalition:

- Creation of widespread end markets
- Improved technical recyclability of the packaging itself
- Industry alignment on packaging design standards
- Proven separability from other materials in MRF processing
- Development of industry-wide commodity specifications
- Proof of a value proposition for MRFs and community recycling programs

Industry funding and integrated work is critical to making fast progress on these issues. In 2019 The Recycling Partnership launched the [Pathway to Circularity](#), an initiative to build a stage-gate process to enable companies to move packaging from technically recyclable to commonly accepted for recycling. This effort is resulting in the creation of voluntary material and packaging-specific collaboratives to bring value chains together to solve packaging and supply challenges pre-competitively.

Addressing the Issue of Cheap Landfill Disposal

In addition to improving the Pathway to Circularity there are policy changes that must be made if curbside recycling services are to evolve into Recycling 2.0. Massive regulatory changes in the 1980s and 1990s drove the development of larger landfills and expanded private ownership of disposal capacity. This helped increase the economies of scale in new, lined landfills and introduced more competitive factors into the disposal marketplace, which was supported by the ability to inexpensively ship solid waste over long distances. Broad expectations that landfilling costs would dramatically increase under the new regulations has not come to pass amid a plentiful supply of disposal capacity.³²

Cheap disposal is a hindrance to building a circular economy. Raising existing state disposal surcharges, as well as creating surcharges or other disposal fees in states without those mechanisms, would begin to close the economic gap between the cost of landfilling and recycling. Revenue from these surcharges and fees can be used to expand recycling efforts, not just for curbside recyclables, but for many other divertible materials. Steadily increasing the cost of disposal over time would also represent that landfills are significant sources of anthropogenic greenhouse gases and represent a poor use of land resources.

³¹ NERC Study: <https://nerc.org/documents/Glass/Northeast%20Recycling%20Council%20-%20MRF%20Glass%20Survey%20Report.pdf>
Glass Recycling Coalition data: http://docs.wixstatic.com/ugd/b315de_8e30fe06e0354bcb90b453013ccb15f8.pdf

³² The Environmental Research and Education Foundation conducts research on landfill tipping fee trends. Its [2019 Analysis of MSW Landfill Tipping Fees](#) documents a slow growth in such fees over the past four years, with regional differences and factors noted.

Bolstering State Recycling Grants and Support

Communities bear the brunt of the cost of collecting and processing recyclables across the nation. There are steps, however, that states can take to strengthen support of local programs, including:

- Restoration of dedicated revenues diverted to state general funds back to the purpose of recycling grantmaking:
 - o The State of Indiana took a major step in this direction in 2019 by doubling grant funding. Other states where this issue should be addressed include Nebraska, North Carolina, and Wisconsin.
- Establishment of new grant funding:
 - o Michigan passed major additions to its recycling grant funding program in 2018, allowing the state to pursue major initiatives in infrastructure development, contamination control, and overall program metrics.
 - o Colorado has approved a planned rise in tipping fee surcharges and revenues to address the state's recycling issues, with a focus on improving infrastructure, markets, and programs along the Front Range.
- Technical assistance, training, and peer networking:
 - o In 2019, The Recycling Partnership held regional recycling best management practices workshops in the Northeast, in Florida and along the West Coast as well as the inaugural **Leadership Summit: 50 Cities Driving the Circular Economy**, which convened recycling coordinators from 50 of the nation's largest cities, geographically dispersed throughout the country to provide technical assistance and help peers learn from each other.
 - o In addition to its quarterly calls with the State Recycling Leaders Group, The Recycling Partnership will convene a 50 states recycling workshop in the summer of 2020.

Innovating State Recycling Policy

The foundations of the modern curbside recycling system can be found in state laws that passed in the late 1980s and early 1990s. These laws set up the basic roles and responsibilities of stakeholders in U.S. curbside programs, including establishing local governments as the primary actors of material collection. Some of these laws included disposal bans, funding, reporting mandates, market development, and other mechanisms to ramp up material collection. States often followed up their first modern solid waste laws with subsequent measures to tweak and improve their programs.

States should continue to innovate with new legislative efforts designed to increase the quantity and quality of materials collected in U.S. curbside recycling programs. Recycling stakeholders should embrace opportunities to advance progressive state recycling policies. The Recycling Partnership is convening stakeholders to identify state-level policies that accelerate the move towards a circular economy through a public-private partnership approach.

Supporting Federal Recycling Policy

The Federal government's role in curbside recycling services in the U.S. historically focused on fostering early market development efforts, providing technical assistance and training, calculating overall recycling metrics, creating critical tools such as the WARM model, and being an important convener of stakeholders at critical times in the system's history. **However, 2019 has seen a surge in Congressional policy activity addressing a wide range of infrastructure development, educational initiatives, research, and program financing that indicates a more active role for the federal government in improving curbside performance in the future. The Recycling Partnership, along with many other stakeholders, supports and encourages federal policy efforts to transform and improve recycling in the U.S.**

Addressing the Issue of Data

None of these improvements or policy actions can succeed without the hard data needed to back it up. After 30 years of curbside program adoption across the U.S., the state of data collection and analysis in the industry remains highly problematic. The Recycling Partnership's experience in collecting data for its studies, its receipt of grant proposals, and its verification of MMP submittals reveal extensive needs for quality control of many of the most basic metrics on program performance. Despite investing substantial public dollars in curbside services, many local programs do not collect data that allows them to effectively calculate key performance indicators such as pound-per-household served. Very few communities have data on the potential amount of curbside recyclable material that is available to collect in their communities. As indicated in this report, only a minority of communities know their inbound contamination, set out, or participation rates. Some communities cannot account for how many households they serve with their programs, even as they place crews and trucks on the street daily to provide curbside recycling services.

Instilling a sense of the value data and how it can be used to improve public recycling services is critical to transforming recycling in the U.S. Steps that can be taken to address this issue include:

- Better collection of specific program data at the local level for key services – curbside, multifamily, drop-off tonnage at a minimum.
- Wider adoption of the Municipal Measurement Program by communities and states, allowing communities to record core program data and to track key performance indicators over time.
- Fundamental changes to state reporting requirements and platforms to standardize collection of basic program metrics.
- Support from U.S. EPA to facilitate effective program measurement.

Conclusion

The curbside recycling system in the U.S. has tremendous potential to contribute solutions to some of the world's most pressing issues, including helping to slow climate change, reducing misutilization of vital resources, and creating a circular economy. Built over 30 years of program and infrastructure development, accomplished through the exercise of political will in thousands of communities across the U.S., and supported through critical investments by private sector actors, the system is poised to take a leap into Recycling 2.0, a transformed and dynamically improving system.

However, that transformation will not occur without dedicated, large scale intervention by all system stakeholders. Chapter 5 of this report spells out specific actions that would, in combination with each other, produce scaled and lasting change.

Strategies to achieve Recycling 2.0 will require:

- **Substantially greater support of community recycling programs with capital funding, technical assistance, and efforts to strengthen and grow local political commitment to recycling services.**
- **Development of new and enhanced state and federal recycling policies.**
- **Continued and expanded investment in domestic material processing and end markets.**
- **Citizen and consumer engagement to create and sustain robust and appropriate recycling behavior.**
- **Continued innovation in the collection, sorting and general recyclability of materials, including the building of flexibility and resiliency to add new materials into the system.**
- **Broader stakeholder engagement in achieving all elements of true circularity, in which the fate of all materials is not just intended to be recycled, but that they are designed, collected, and actually turned into something new.**

The state of the planet's health demands dedicated and swift action to protect natural resources and abate climate change. The Recycling Partnership stands ready to take on this challenge and calls on the many public and private sector stakeholders to join in building a circular economy. Together.

Glossary of Terms

Aseptic containers – Cartons or containers that contain shelf-stable consumables such as milk, soup, tomatoes, pudding or other goods. Sometimes referred to as “Tetra Pak,” which is the manufacturer of one brand of the containers.

Automatic collection – Households in a given community are automatically included in a recycling program, much in the way that almost all communities will automatically provide a means for trash pick-up and hauling.

Bulky rigid plastics – Oversized HDPE and PP items and containers. According to the Association of Plastic Recyclers Design® Guide for Plastics Recyclability, any item over five gallons is considered “Bulky.” Examples include crates, buckets, baskets, totes, and lawn furniture.

Cartons – packaging for food and beverage products, both shelf-stable and refrigerated. Aseptic cartons (defined above) are often used for shelf-stable applications. Gable-top cartons are commonly used in refrigerated applications, such as milk and juice.

China’s scrap ban – Enacted in March 2018 after being announced the previous year during the National Sword customs contamination enforcement action (which the ban is sometimes erroneously referred to). Both the ban and National Sword are often used as placeholder terms to describe the outsized economic impact of this large export market disruption (estimated at a fifth of all commodities market).

Commercial recycling – recycling collected from commercial, institutional or industrial sources.

Contamination – Trash and/or materials that are not accepted in a given curbside recycling program, such as food, plastic bags or toys. It can also refer to improperly sorted or managed materials – food-soiled paper or containers that still include liquids.

Curbside mix – The combination of recyclable materials that appears in recycling collection containers. This mix of materials can vary based on what types of packaging are collected for recycling in different regions.

Drop-off services – Recycling collection points for residential and sometimes commercial recyclables. Can be used as a replacement for a community that does not offer curbside collection of recyclables, or in rural areas where no curbside collection of recyclables or trash is offered. Drop-off can also refer to the collection bins in grocery and hardware stores that collect film recyclables such as plastic bags and filler from shipping boxes that are puffed with air.

Fiber – Packaging or other recyclable materials made of paper, such as old corrugated containers, paperboard, or mixed paper.

Film plastics – This material term can refer to anything from plastic wrap to plastic bags to vegetable freezer bags and plastic bags filled with air in shipping boxes. It usually refers to a type of materials that many mistakenly put into curbside recycling, but that is meant for drop-off at a grocery or hardware store collection site.

Material recovery facility (MRF) – A facility that sorts, processes, and bales different types of aggregated recyclables for sale to re-processors.

Multifamily recycling – Recycling collection from locations with numerous households, such as apartments, townhomes, condos, or generally any property with five or more habitable units.

Old corrugated containers (OCC) – A common type of fiber packaging often used in shipping products that contains a wavy middle layer that gives the packaging strength, commonly referred to as cardboard.

Participation rate – The percentage of households that put out a cart at least once a month or over two-to-three collection cycles.

Plastic identification numbers – This report uses many different numbers and abbreviations to describe different types of plastics used in the manufacture of packaging. The Resin Identification Code system describes seven types of commonly found plastics:

- “1” the product is made out of polyethylene terephthalate (PET) (beverage containers, cups, clamshells, etc.)
- “2” high-density polyethylene (HDPE) (milk jugs, detergent containers, etc.)
- “3” polyvinyl chloride (PVC) (pipes, siding, flooring, etc.)
- “4” low-density polyethylene (LDPE) (plastic bags, six-pack rings, tubing, etc.)
- “5” polypropylene (PP) (Yogurt cups, margarine tubs, other food containers, etc.)
- “6” polystyrene (PS) (Styrofoam, or expanded polystyrene, coffee cups, cafeteria trays, etc.)
- “7” other plastics, such as acrylic, polycarbonate and polylactic acid (PLA), etc.

Plastics #3-7 – An aggregation of all non-#1 (PET) or -#2 (HDPE) plastics. Some communities use this term (or plastics #1-7) to denote that all plastics are accepted in a given curbside program, for ease of communication.

Plastics #3-7 bale – An unsorted plastics bale, typically with #1 (PET) or #2 (HDPE) sorted positively (actively sorted out at the MRF) and the rest of the plastics being aggregated and baled, unsorted, following MRF separation of other materials. Never a commodity with robust market value, what marginal value it did have disappeared following China’s scrap ban. There are efforts underway to divest #5 (polypropylene) from the #3-7 bale by investing in equipment for MRFs to help sort it out to make it easier for it to be harvested for end markets.

Reprocessor – Any facility that consumes materials from a MRF and processes it into a commodity-ready material. Examples include plastics reclaimers, paper mills, aluminum mills, steel mills or glass beneficiators.

Residential mixed paper (RMP) – The fiber portion of the curbside mix that includes everything but separated OCC. This includes all sorts of fiber-based packaging, such as containerboard, paperboard, magazines, office and scrap paper and catalogs.

Single-family recycling – recycling collection from single-family homes or generally from buildings up to four habitable units.

Single-stream collection of recyclables – The practice of collecting commingled recyclable materials all in one container at the curbside. This varies from “dual-stream” or “multi-stream” collection, which aggregates fiber, such as newspaper and cardboard, and bottles, cans, and other containers in two or more receptacles.

Subscription-based (or “opt-in”) recycling collection – A community recycling collection program that requires some level of household action or engagement in order to initiate curbside recycling pick-up, whether it be simply calling a city or waste hauler and requesting a cart or bin for recycling, or having to research and contract with a hauler in the area to set up and be charged for the service.

Appendix A: Notes on Community Data Sources

The Recycling Partnership used a number of sources of data on community recycling programs to complete this report. This appendix shares information about these sources.

The Recycling Partnership 2019 State of Curbside Survey

This survey was released to representatives of community recycling programs in July 2019 across the U.S. through various communication channels with the assistance of state recycling programs state recycling organizations, regional recycling organizations, and Resource Recycling magazine. Responses were received through September 2019. Data from valid respondents was verified on a question-by-question basis and dismissed when the information provided was inadequate or unconfirmable. The verified respondents to the survey represent a diverse cross-section of recycling programs across the U.S. While survey results provide helpful insight on the current state of curbside recycling, the results are not generalizable to every recycling program in the country. As discussed in this report, willingness to voluntarily fill out a survey may skew respondents toward higher performing programs. The Figure below describes The Recycling Partnership 2019 State of Curbside survey respondents. In addition, the average size of the respondent community data used in the report was 61,111 households but the median was 18,976.

Figure A-1: Community Responses to The Recycling Partnership's 2019 State of Curbside Survey

	Number of Communities	Percentage
Large Communities (Over 50,000 HHs)	113	27.23%
Medium Communities (15,000-50,000 HHs)	108	26.02%
Small Communities (Under 15,000 HHs)	194	46.75%
Counties	62	14.29%
Cities	358	82.49%
Regional Entities/Tribal Government/Other	14	3.23%

Municipal Measurement Program Data

The Recycling Partnership has coordinated with Emerge Technologies to offer the **Municipal Measurement Program (MMP)** to allow community recycling programs to record data and track performance and impacts from their waste, curbside recycling, multifamily recycling, drop-off recycling, and organics management services. The Recycling Partnership reviews and verifies the data submitted by local programs. A total of 49 separate verified MMP reports were used for the State of Curbside report, representing a range of programs across the country. The number of curbside-served households of the MMP communities used in the report ranged from 2,300 to 187,000, with an average of 27,720 and median of 14,600.

West Coast Contamination Initiative Research

The Recycling Partnership launched the West Coast Contamination Initiative in 2019 to better understand the state of residential curbside recycling in California, Oregon, and Washington. Cities, MRFs, and residents were surveyed to identify the gaps and leverage points to reduce contamination from the residential recycling stream in these states. The surveys gathered data from more than 200 West Coast communities, with 176 in California, 12 in Oregon, and 24 in Washington. Data on curbside households, tonnage, contamination issues, fees, processing charges, and education and outreach resources from the West Coast data was used for this report.

The Recycling Partnership Grantee Reporting

Through its grants to communities, the Recycling Partnership receives baseline data and grant progress reports from grantees that to help gauge pound-per-household impacts of the transition from bins to cart-based collection and overall performance levels of cart-based programs. For this report, The Recycling Partnership used data from 15 completed grant projects and 13 grant projects still underway as of November 2019.

Media Story Tracking

Beginning in January 2018, The Recycling Partnership started to collect local, regional, and national published media stories regarding changes to community recycling programs on issues such as program elimination, changes to accepted materials, changes to local recycling fees, and MRF processing charges. The 321 media stories collected through November 2019 provided data for this report on these issues.

Appendix B:

List of U.S. Communities Eliminating Curbside Recycling Programs (through November 2019)

Since January 2018, The Recycling Partnership tracked local, regional, and national media stories on changes to local recycling programs and conducted confirmation of individual stories on program elimination as part of the research for this report.

City	State	# of HH's affected
Enterprise	AL	11,261
Casa Grande	AZ	14,000
Globe	AZ	2,897
Safford	AZ	3,260
Sierra Vista	AZ	43,585
Surprise	AZ	37,000
Thatcher	AZ	4,982
Page	AZ	2,392
Akron	CO	918
Deltona	FL	33,145
Grinnell	IA	3,217
Olney	IL	3,843
El Dorado	KS	5,360
Madison County	KY	27,623
Winchester	KY	7,248
Plymouth	MA	23,452
Bradley	ME	686
Dedham	ME	1,191
Eddington	ME	798
Gouldsboro	ME	1,310
Holden	ME	1,077
Orrington	ME	1,518
Presque Isle	ME	2,392
Kennebunkport	ME	2,873
Westland	MI	26,423
Frenchtown Twp.	MI	7,800
Perryville	MO	3,072
Scott City	MO	1,593
St Martins	MO	451

City	State	# of HH's affected
Taos	MO	479
Trenton	MO	2,636
Wardsville	MO	622
Russellville	MO	380
Warrenton	MO	3,065
Jackson	MS	59,219
Franklin	NH	3,300
Hooksett	NH	4,386
Bosque Farms	NM	1,154
Silver City	NM	3,391
Fort Edward	NY	1,516
Oregon	OH	7,208
Milton-Freewater	OR	2,185
Crawford County	PA	36,482
Pine Ridge	SC	906
Beaumont	TX	41,040
Municipal Utility District 119	TX	622
Abingdon	VA	3,137
Broadway	VA	1,422
Dayton	VA	593
Elkton	VA	1,181
Harrisonburg	VA	25,911
Mount Crawford	VA	205
Timberville	VA	1,132
College Place	WA	3,367
Total		480,906

Appendix C: Additional Data on Community/MRF Processing from The Recycling Partnership's 2019 State of Curbside Survey

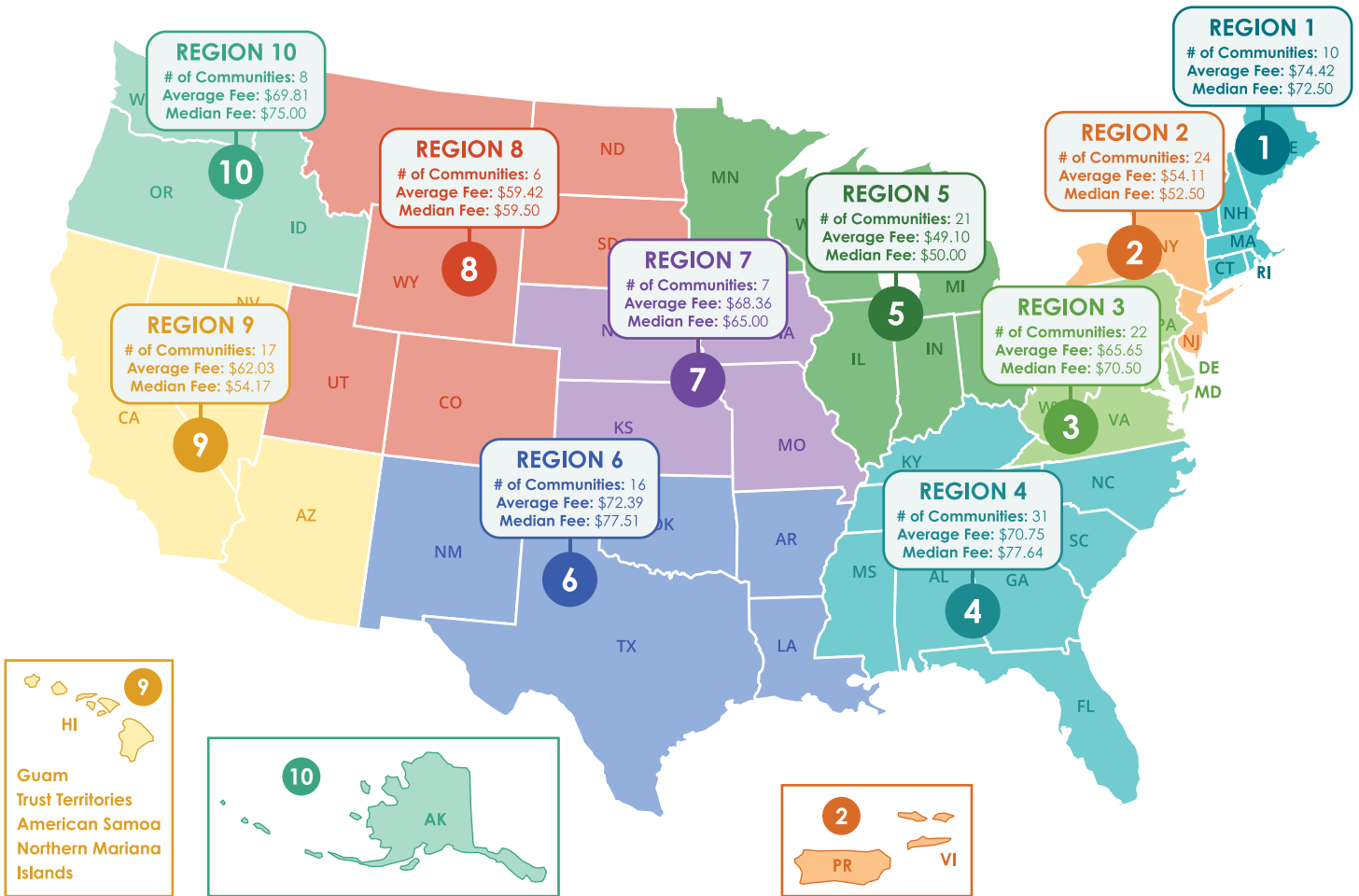
Regardless of whether a community's recycling processing is arranged directly by the community, a contracted public agency, or a contracted hauler, of the 406 communities responding, 95 percent of respondents knew the name of the MRF that processes their community's recycling. The 5 percent of communities that did not know the MRF, contract with a hauler that is responsible for contracting or arranging processing with a MRF and is not directly involved in processing decisions. The Figure below shows additional data on how many communities experience MRF processing charges.

**Figure C-1: Communities Experiencing MRF Processing Charges in
The Recycling Partnership's 2019 State of Curbside Survey**

Does Your MRF Charge You Processing Fees?	Number of Communities	Percent	Number of Communities with MRF Fees	Percent
Yes	196	46%		
Yes-provided fee data			163	83%
Yes-no fee data provided			33	17%
No	126	29%		
N/A (not applicable)	107	25%		
TOTAL	429	100%	196	100%

The Figure below shows how reported processing charges break down by EPA Region.

Figure C-2: MRF Processing Charges by EPA Region



The Figure below provide data on survey respondents that saw processing fee changes in the past year.

Figure C-3: Changes in MRF Processing Charges reported by Respondents to The Recycling Partnership's 2019 State of Curbside Survey

Did Your Processing Fees Increase in the Past Year?	Number of Communities	Percent	Number of Communities with Fee Increases	Percent
Yes	121	66%		
Provided a Monetary Value			70	58%
No Monetary Value Provided			51	42%
No	62	34%		
TOTAL	183	100%	121	100%

The survey provided an opportunity for communities to offer additional information regarding the community's MRF processing fee increases over the last year. Out of the 121 providing additional processing fee increase information, 29 communities provided information in an open-ended text format. Yearly contract-related processing fee increases, including those tied to the CPI, were indicated by 45 percent of communities responding with additional information. Another 45 percent of communities indicated that they did not have a tip fee until 2018-19 or previously received a rebate or reimbursement for recyclables but do not any longer. The other 10 percent indicated that the fee increase was due to contamination and another community estimated that processing fee increased 5-10 percent over the last year. The below summarizes the additional community MRF processing fee increase information provided by respondents.

Figure C-4: Additional Processing Fee Information from Respondents to The Recycling Partnership's 2019 State of Curbside Survey

Processing Fee Changes	Number of Communities	Percent
Fee increase due to yearly contractual increases (CPI, annual escalator, contract negotiation)	13	45%
Fee increase due to contamination	2	7%
Fee increased 5-10%	1	3%
No tip fee until 2018 or 2019	8	28%
Previously received rebate/reimbursement for recyclables	5	17%
TOTAL	29	100%

The following Figure shares data from survey respondents on the revenue sharing agreements.

Figure C-5: Additional Details on MRF Revenue Sharing Arrangements from Respondents to The Recycling Partnership's 2019 State of Curbside Survey

Does Your MRF Contract Have a Revenue Sharing Agreement Separate From The Processing Fee?	Number of Communities	Percent	Number of Communities with Fee Increases	Percent
Yes	90	50%		
Provided revenue share details			62	69%
Did not provide any details			28	31%
N/A	90	50%		
TOTAL	180	100%	90	100%

Appendix D:

Additional Contamination Data

As a supplement to The Recycling Partnership's 2019 State of Curbside Survey responses, The Recycling Partnership interviewed some select communities about their cart-tagging initiatives and the outcomes of their efforts. The Figure below presents examples of data on the need for cart tagging over time as one critical way to measure progress.

Figure D-1: Examples of Cities Experiencing Decreases in Cart Tagging

Cities	Reduction in Tagging/Rejection
El Paso, Texas	Rejection rates trended down across all tagged routes
New Bedford, Mass.	Overall tagging rate declined by 41% over the course of eight weeks
Dartmouth, Mass.	Overall tagging rate declined by 82% over the course of eight weeks
Lynn, Mass.	From Week one to nine, the tagging rates of two routes declined by more than 40%
Phoenix, Ariz.	Oops tags declined by 8%, rejection rate declined by 5%
Suburban city in Ohio	Overall tagging rate declined from 16% to 5% over the course of six weeks

The impacts of cart tagging can also be measured by analyzing inbound contamination rates at the MRF. The Figure below shows examples of cities who found that their cart-tagging programs had measurable success in reducing inbound contamination rates, further reinforcing the merits of a tagging program.

Figure D-2: Examples of Cities Experiencing Decreases in Inbound Contamination

Cities	Drop in Inbound Contamination
El Paso, Texas	29% decrease in contamination inbound to the MRF from tagged routes
Large City in Ohio	Decrease in inbound contamination rate from 38.68% to 23.23%
Lynn, Mass.	Reduction in inbound contamination from roughly 60-80% to 12% or less
Suburban city in Ohio	Reduction in inbound contamination from 14.23% to 10.30%