eunomia

THE 50 STATES OF RECYCLING

A State-by-State Assessment
of Containers and Packaging Recycling Rates.

March 2021

Supported by
Ball Corporation

CONTENT

FORWARD

“The 50 States of Recycling”

The impact of the packaging pollution crisis is growing every day. Here in the United States, our recycling system is outdated and under resourced. Developed at the municipal level during the 1950s and 1960s, it was never designed to process all the single use materials that we’re throwing away today. The root of the problem is this: we have recycling policies in place that make it cheaper to pollute the planet than to use and recycle sustainable materials.

At Ball, we are committed to doing what we can to move toward a truly circular economy, where materials can be – and actually are – used again and again. That is why we supported Eunomia in the creation of this comprehensive look at the American recycling system: The 50 States of Recycling.

We believe that by better understanding the challenge before us, we can start to work together to make our systems better.

We are thrilled to partner with Eunomia on the release of this report and we sincerely hope it can help inspire a national shift to more circular and comprehensive recycling system.

As the name of the report implies, every state does this differently. Every state has different policies, different levels of access and different infrastructure when it comes to recycling, making it exceptionally difficult to drive comprehensive and meaningful change. After all, effective recycling systems can lead to impressive environmental and economic impact in addition to mitigating the packaging pollution crisis. In fact, as noted in the following report, recycling could support the reduction of more than 5% of global CO_2, which is the equivalent of grounding all commercial flights globally and taking 65% of cars off the road for a year. Recycling may not be the only solution to the climate crisis, but it is certainly part of the solution.

Despite the scale of the challenge, it is clear that change is coming. As a nation we have a once in a generation opportunity to modernize and upgrade our collective recycling mindset. We must seize this opportunity to turn the corner and support policies, research and infrastructure to bring us to a more sustainable future.

Our environment and the future of our planet depend on it.

John Hayes, CEO Ball Corporation

1 STATE-BY-STATE RECYCLING RATES, RANKS, AND KEY FINDINGS

For over 25 years, municipalities and private sector waste management companies in the United States (U.S.) have collected consumer packaging through residential and commercial recycling programs. While the U.S. Environmental Protection Agency (EPA) calculates the national recycling rate[1] for different materials (including packaging) on an annual basis, to date there has been no ability to compare the recycling rates of a common set of containers and packaging materials (CCPM) within or across all states due to conflicting measurement methodologies. This study presents a first-of-its-kind state-by-state comparable assessment of recycling rates for common containers and packaging materials (CCPM) and determines generation, recycling, and disposal rates on a pound per capita basis. It then ranks the states according to performance and provides qualitative insights into some of the factors that may be contributing to higher or lower recycling rates.

PLASTICS

- PET Bottles
- PET other rigid plastics (thermoforms, trays)
- HDPE bottles
- PP
- Rigids #3-7

CARDBOARD AND BOXBOARD

GLASS BOTTLES AND JARS

ALUMINUM CANS

STEEL CANS

CALCULATING A COMPARABLE STATE-BY-STATE RECYCLING RATE FOR CONTAINERS AND PACKAGING

Using available data sourced from the EPA, state governments, counties, municipalities, cities, sorting facilities, and material processors, a methodology was developed to calculate comparative packaging recycling rates across states and across materials. The purpose of this analysis is to establish a 2018 baseline from which policy makers, service providers, operators, and investors can make informed strategic decisions on what measures are needed in the short, medium, and long term to support a circular economy, replace primary with secondary materials, and reduce greenhouse gas (GHG) emissions.

ASSESSMENT OF RECYCLING RATES, NOT COLLECTION RATES

In calculating comparable recycling rates, the focus of this report is not on assessing what is collected for recycling, what is sorted at a material recovery facility (MRF), or even what is received by a material processor, but instead on what material leaves the processor and is incorporated into a new product – a secondary material that can replace the use of primary material demonstrating the material's circularity – the real recycling rate. Why the focus on measuring the recycling rate at the point where a material becomes a product that can be used in new goods and packaging is the only meaningful point of measurement is explained as a key takeaway below.

FACTORS THAT CONTRIBUTE TO HIGH PERFORMANCE

Recycling rates and rankings can serve as a mechanism to compare performance across states and material types and help set a baseline from which future policy and programs can be evaluated. However, understanding the factors that can influence performance is key for states and program operators to determine what actions to take next.

Our analysis of published information on service provision, access, programs, policies, as well as economic factors (such as the cost of disposal) in each state has revealed a number of factors that are likely to be contributing to high performance.

A summary of these factors is provided below.

WHY IS A COMPARABLE ASSESSMENT OF PACKAGING RECYCLING RATES IMPORTANT?

THE CIRCULAR ECONOMY

The goal of the circular economy is to keep products and materials in productive use for as long as possible, as in many consecutive cycles as possible, such that there is no waste and the use of natural resources is minimized. To achieve this goal, the recycling system must supply the secondary material with the quality necessary to produce new products, displacing primary material. Understanding the performance of the existing recycling system, and the losses for each material in the recycling steps across states, is an indicator of how effective these systems are at supporting a circular economy and will help inform decisions around policies, programs, and infrastructure.

CLIMATE CHANGE

In 2016, GHG emissions associated with the production of materials disposed as municipal waste were estimated to be between 4.4 and 5.7 billion metric tonnes of CO2e. With the continued growth of packaging materials, that figure is expected to increase to between 5.6 and 7.3 billion metric tonnes by 2030.[2]

Although the waste management sector is often referenced as being directly responsible for only 3% of global GHG emissions,[3] reducing waste-related emissions can have an enormous impact in terms of mitigating climate change. It has been estimated that regionally customized and holistic waste and resource management models can reduce global CO2 emissions by up to 5% – the equivalent of grounding all commercial flights globally and taking 65% of cars off the road.

Across its lifecycle, the greatest GHG emissions from packaging stem from the use of virgin material in the production process and the emissions associated with material extraction. Under a circular economy, the more secondary recycled material that can be fed into the supply chain to replace virgin material, and the more times that material can circulate within the system, the greater the GHG benefits. The GHG saving opportunity depends on both the packaging design phase — in which materials created are easier to recycle and higher quality — and the collection, sorting, and recycling infrastructure. These two key levers are the subject of various waste, packaging, and recycling policies that are outlined in this report.

EXTENDED PRODUCER RESPONSIBILITY (EPR)

In 2020, the Break Free from Plastic Pollution Act[4] became the first federal bill to present EPR as a financial mechanism to support the provision of recycling services and, through established material-specific targets, to increase performance of the recycling system, thereby supporting the transition to a circular economy. Under the legislation, producers of covered products – including packaging, containers, food service products, and paper, regardless of recyclability, compostability, and type of material – will be required to design, manage, and finance programs to collect and process product waste that would normally burden state and local governments. EPR legislation would place a requirement on producers to work together through a Producer Responsibility Organization (PRO) to take responsibility of the packaging at the end of its like and implement programs that will reduce environmental impact and maximize the amount of material that could flow through a circular economy. Producers will invest in U.S. domestic recycling and composting infrastructure, cover the costs of waste management and clean-up, and promote awareness-raising measures for covered products.[5]

Transferring the cost of managing products and packaging at end-of-life from municipalities and ratepayers to producers is only one component of EPR. At the heart of EPR is the intention for policy to provide incentives to consider environmental concerns in the design of products. Incorporating material-specific targets that will increase over time will help to guarantee that more recycled material is available to replace virgin material in new products, reducing GHG emissions and supporting a circular economy. Also instrumental for putting the circular economy into practice is the eco-modulation of producer fees based on design for recyclability criteria, which can incentivize producers to make better design choices that consider how a product is managed at end-of-life.

The 2018 recycling rates calculated in this study will be informative to those states currently in the process of drafting (or considering drafting) EPR bills. EPR regulations that place obligations on producers to meet individual, material-specific recycling targets that increase over time, and can also include requirements to incorporate a certain percentage of recycled content in packaging and/or products. If properly designed, EPR can drive strategic investment in the recycling sector and encourage better packaging design with recyclability in mind.

CHALLENGES IN THE RECYCLING SECTOR

The recycling sector has faced many challenges over recent years.

Overseas markets for low quality sorted and mixed materials have been restricted, international conventions have stymied the flow of some materials across borders, and material markets have continued to fluctuate. These challenges have culminated in increasing recycling costs for municipalities and, ultimately, for households and businesses.

At the same time, a growing number of brand owners are making consumer-facing commitments that their packaging is (or will be) 100% recyclable, compostable or biodegradable. They are also making commitments and claims on recycled content in their products. Consumers are demanding that their favorite brands and packaging producers be more engaged with the end-life of their products, whether that be to help mitigate climate change or the plastic pollution crisis.

The global COVID-19 pandemic has only exacerbated these challenges for the recycling industry. For example, because of increased online purchasing and more people working from home, the pandemic has resulted in significant reductions in the amounts of cardboard being generated from the commercial sector, while at the same time creating a significant increase in home delivery volumes.

RANKINGS AND RATES, THEMES, AND TAKEAWAYS

Based on the latest data openly available, this study analyzes available waste and recycling data across the U.S. and presents a consistent calculation methodology to quantify the amount of CCPM generated, collected for recycling, recycled (accounting for contamination and processing losses), and disposed of in 2018. The analysis provides a pre-COVID-19, state-by-state baseline assessment of the recycling rates for each of the most common consumer packaging materials.

The tables on the following pages" or the "State-by-State overview of CCPM recycling rates tables.

- Combined and individual material recycling rates for:
  - Rigid plastic packaging
  - Glass bottles and jars (including and excluding aggregate use)
  - Aluminum cans
  - Steel cans
  - Cardboard and boxboard
- CCPM recycling rank
- CCPM recycling rank excluding cardboard and boxboard
- Pounds per capita generated, recycled and disposed
- Indication as to whether the state has a DRS in addition to curbside services
- Indication as to whether the state has policy that is supportive of high CCPM recycling (e.g., landfill bans on packaging or universal recycling requirements)
- Indication of the cost of disposal
- Indication of the availability and quality of data

Material-specific recycling rates, an overall recycling rate, and a rank for all CCPM, and for CCPM excluding cardboard and boxboard, are presented in the next page. The states have been ranked according to the overall CCPM recycling rate that excludes cardboard and boxboard as cardboard and boxboard account for 73% of the total weight of CCPM recycled in 2018 (much of this driven from the commercial sector). Although cardboard and boxboard recycling is crucial to increasing diversion, the large quantity of this packaging waste stream masks the performance of other packaging materials, which need to be targeted from a GHG mitigation perspective.

Key takeaways from the ranking of recycling rates excluding cardboard and boxboard are as follows:

- **8 out of the 10 highest recyclers all have a Deposit Return System (DRS) for beverage containers, commonly known as a "bottle bill."**
- **7 out of the 10 highest recyclers all have high disposal costs**.

The following is a summary of the top performing recycling states according to different metrics:

- **State with the highest recycling rate for all CCPM:** Maine (74%)
- **State with the highest recycling rate for CCPM excluding cardboard and boxboard:** Maine (72%)
- **State generating the least amount of CCPM per capita:** Washington (258 lbs./capita)
- **State disposing the least amount of CCPM per capita:** Maine (91 lbs./capita)

STATE-BY-STATE OVERVIEW OF CCPM RECYCLING RATES LISTED ACCORDING TO CCPM RECYCLING RANK (EXCLUDING CARDBOARD/BOXBOARD)

	CCPM Recycling Rate without Cardboard	Rigid Plastics Total	PET bottles	Aluminum Cans	Steel Cans	Glass Bottles and Jars [a]	Glass Bottles and Jars [b]	Bottle Bill	CCPM Supportive Legislation
1 MAINE	72%	57%	78%	85%	29%	83%	73%	Yes	No
2 VERMONT	62%	37%	51%	67%	48%	76%	55%	Yes	Yes
3 MASSACHUSETTS	55%	28%	38%	70%	39%	71%	50%	Yes	Yes
4 OREGON	55%	26%	69%	85%	35%	72%	53%	Yes	No
5 CONNECTICUT	52%	33%	47%	61%	24%	66%	46%	Yes	No
6 NEW YORK	51%	32%	54%	64%	43%	66%	52%	Yes	No
7 MINNESOTA	49%	14%	25%	43%	48%	66%	35%	No	No
8 MICHIGAN	48%	39%	57%	86%	35%	56%	42%	Yes	No
9 NEW JERSEY	46%	27%	22%	60%	60%	56%	30%	No	No
10 IOWA	44%	18%	30%	76%	19%	66%	61%	Yes	No
11 CALIFORNIA	44%	30%	57%	78%	29%	54%	44%	Yes	Yes
12 WISCONSIN	44%	21%	24%	27%	61%	65%	34%	No	Yes
13 MARYLAND	44%	31%	30%	54%	57%	52%	27%	No	No

a *Including use as aggregate and landfill cover*
b *Excluding use as aggregate and landfill cover*

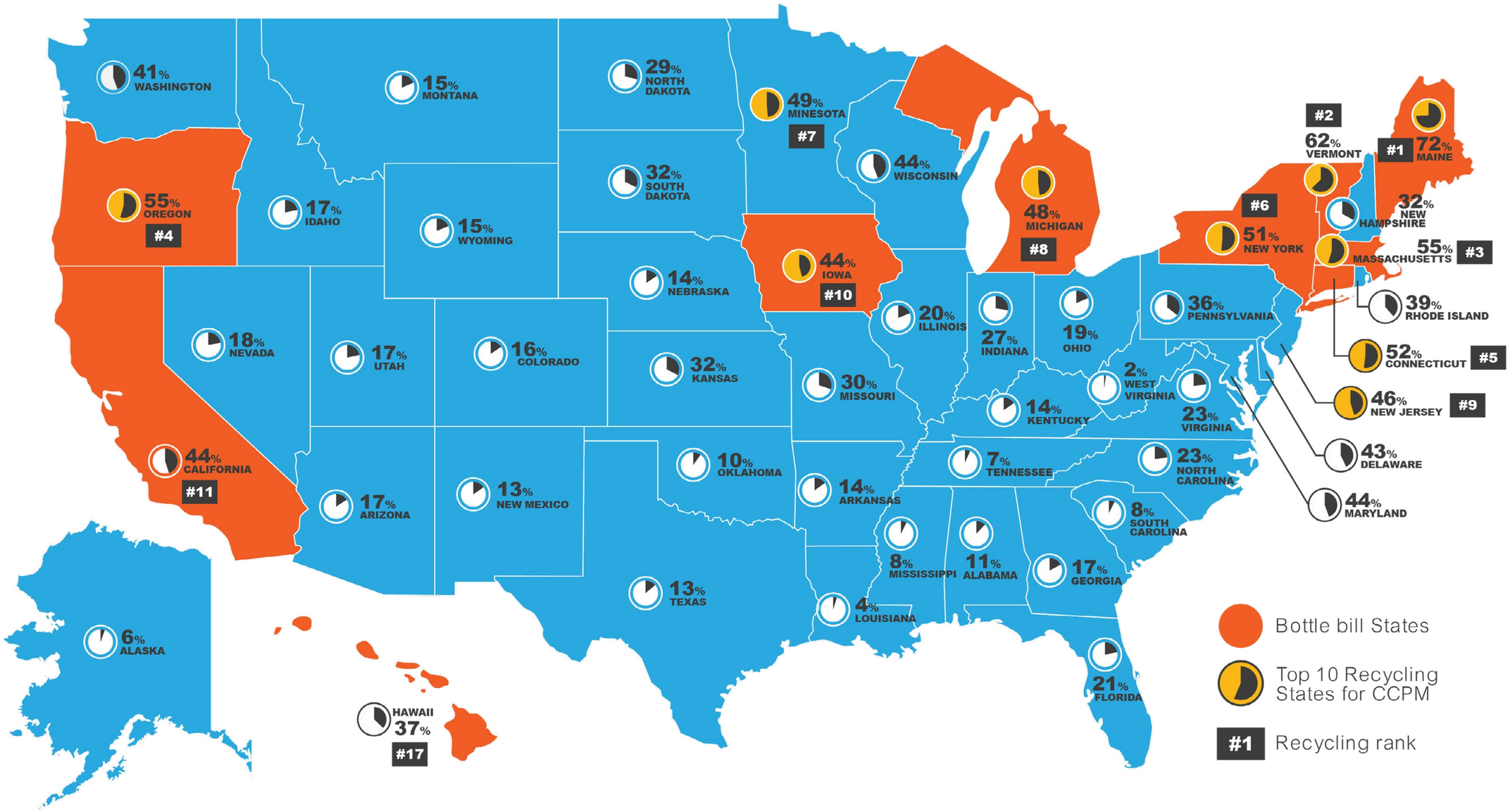





	CCPM Recycling Rate without Cardboard	Rigid Plastics Total	PET bottles	Aluminum Cans	Steel Cans	Glass Bottles and Jars [a]	Glass Bottles and Jars [b]	Bottle Bill	CCPM Supportive Legislation
14 DELAWARE	43%	12%	9%	36%	35%	61%	32%	No	Yes
15 WASHINGTON	41%	21%	28%	46%	46%	53%	28%	No	No
16 RHODE ISLAND	39%	28%	36%	39%	61%	47%	25%	No	No
17 HAWAII	37%	26%	44%	61%	4%	44%	40%	Yes	No
18 PENNSYLVANIA	36%	21%	14%	48%	69%	44%	23%	No	No
19 NEW HAMPSHIRE	32%	25%	29%	32%	32%	38%	20%	No	No
20 SOUTH DAKOTA	32%	13%	16%	25%	25%	47%	25%	No	No
21 KANSAS	32%	14%	16%	25%	26%	47%	25%	No	No
22 MISSOURI	30%	13%	9%	18%	26%	45%	24%	No	No
23 NORTH DAKOTA	29%	12%	15%	23%	23%	43%	23%	No	No
24 INDIANA	27%	17%	16%	17%	37%	35%	19%	No	No
25 VIRGINIA	23%	9%	10%	23%	40%	45%	25%	No	No
26 NORTH CAROLINA	23%	8%	8%	16%	27%	39%	22%	No	Yes
27 FLORIDA	21%	8%	7%	25%	24%	33%	18%	No	No
28 ILLINOIS	20%	11%	12%	24%	25%	26%	14%	No	No
29 OHIO	19%	9%	11%	16%	24%	32%	17%	No	No
30 NEVADA	18%	11%	16%	15%	18%	25%	13%	No	No
31 UTAH	17%	12%	14%	17%	17%	24%	13%	No	No

	CCPM Recycling Rate without Cardboard	Rigid Plastics Total	PET bottles	Aluminum Cans	Steel Cans	Glass Bottles and Jars [a]	Glass Bottles and Jars [b]	Bottle Bill	CCPM Supportive Legislation
32 GEORGIA	17%	9%	9%	20%	24%	24%	13%	No	No
33 ARIZONA	17%	14%	15%	16%	15%	23%	12%	No	No
34 IDAHO	17%	11%	13%	17%	17%	23%	12%	No	No
35 COLORADO	16%	9%	8%	14%	18%	23%	12%	No	No
36 MONTANA	15%	10%	12%	15%	15%	21%	11%	No	No
37 WYOMING	15%	10%	12%	15%	15%	21%	11%	No	No
38 ARKANSAS	14%	7%	5%	12%	13%	22%	12%	No	No
39 KENTUCKY	14%	7%	8%	16%	11%	22%	12%	No	No
40 NEBRASKA	14%	13%	14%	19%	21%	13%	7%	No	No
41 NEW MEXICO	13%	8%	10%	13%	13%	18%	9%	No	No
42 TEXAS	13%	10%	11%	16%	23%	13%	7%	No	No
43 ALABAMA	11%	5%	6%	16%	11%	14%	8%	No	No
44 OKLAHOMA	10%	7%	7%	13%	14%	13%	7%	No	No
45 MISSISSIPPI	8%	4%	4%	12%	8%	11%	6%	No	No
46 SOUTH CAROLINA	8%	4%	2%	10%	17%	10%	5%	No	No
47 TENNESSEE	7%	4%	3%	17%	11%	7%	4%	No	No
48 ALASKA	6%	1%	1%	3%	8%	11%	6%	No	No
49 LOUISIANA	4%	5%	4%	11%	5%	3%	2%	No	No
50 WEST VIRGINIA	2%	2%	3%	7%	7%	1%	1%	No	No

STATE-BY-STATE OVERVIEW OF CCPM RECYCLING RATES LISTED ACCORDING TO CCPM RECYCLING RANK (EXCLUDING CARDBOARD/BOXBOARD)



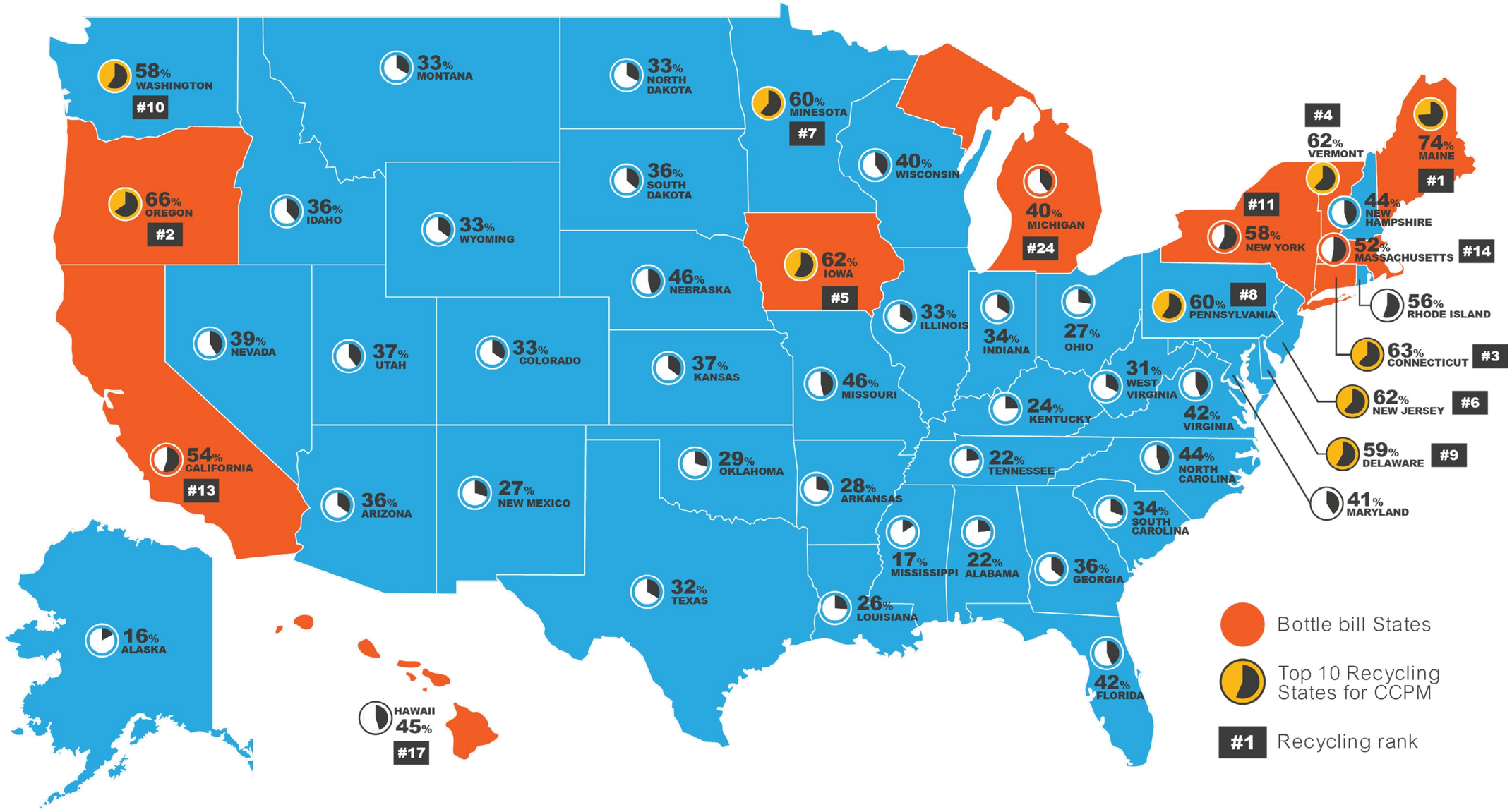
STATE-BY-STATE OVERVIEW OF CCPM RECYCLING RATES LISTED ACCORDING TO CCPM RECYCLING RANK

	CCPM Recycling Rate with All CCPM	LBS/Capita Recycled	Carboard and Boxboard	PET Bottles	PET Other Rigid	HDPE Bottles	PP Containers	Rigid Plastics #3-7	Data Quality and Availability	Disposal Costs in Top 25% of US
1 MAINE	74%	285	77%	78%	9%	57%	28%	15%	Fair	Yes
2 OREGON	66%	230	74%	69%	2%	35%	3%	2%	Good	Yes
3 CONNECTICUT	63%	252	74%	47%	4%	29%	16%	6%	Good	Yes
4 VERMONT	62%	201	64%	51%	4%	53%	13%	5%	Good	Yes
5 IOWA	62%	233	75%	30%	3%	18%	4%	4%	Fair	No
6 NEW JERSEY	62%	247	73%	22%	10%	46%	16%	14%	Fair	Yes
7 MINNESOTA	60%	206	70%	25%	2%	18%	1%	2%	Good	No
8 PENNSYLVANIA	60%	229	77%	14%	9%	37%	23%	15%	Fair	Yes
9 DELAWARE	59%	238	69%	9%	7%	16%	19%	11%	Good	Yes
10 WASHINGTON	58%	160	75%	28%	4%	28%	19%	10%	Good	Yes
11 NEW YORK	58%	168	64%	54%	7%	24%	4%	2%	Good	Yes
12 RHODE ISLAND	56%	186	66%	36%	4%	51%	8%	5%	Good	Yes
13 CALIFORNIA	54%	204	60%	57%	12%	26%	11%	12%	Good	No
14 MASSACHUSETTS	52%	201	52%	38%	10%	35%	15%	10%	Good	Yes

	CCPM Recycling Rate with All CCPM	LBS/Capita Recycled	Carboard and Boxboard	PET Bottles	PET Other Rigid	HDPE Bottles	PP Containers	Rigid Plastics #3-7	Data Quality and Availability	Disposal Costs in Top 25% of US
15 MISSOURI	46%	174	58%	9%	7%	22%	10%	7%	Fair	No
16 NEBRASKA	46%	170	64%	14%	6%	17%	10%	8%	Fair	No
17 HAWAII	45%	191	57%	44%	5%	18%	6%	3%	Good	Yes
18 NORTH CAROLINA	44%	177	67%	8%	2%	16%	3%	2%	Fair	No
19 NEW HAMPSHIRE	44%	173	53%	29%	5%	37%	13%	7%	Limited	Yes
20 VIRGINIA	42%	129	56%	10%	2%	18%	2%	1%	Good	No
21 FLORIDA	42%	173	61%	7%	3%	19%	5%	3%	Good	No
22 MARYLAND	41%	128	38%	30%	14%	46%	17%	12%	Good	No
23 WISCONSIN	40%	148	40%	24%	10%	38%	4%	4%	Fair	No
24 MICHIGAN	40%	142	35%	57%	5%	56%	7%	7%	Good	No
25 NEVADA	39%	141	54%	16%	2%	14%	4%	2%	Fair	No
26 UTAH	37%	143	52%	14%	5%	19%	3%	2%	Limited	No
27 KANSAS	37%	141	43%	16%	5%	19%	5%	4%	Limited	No
28 SOUTH DAKOTA	36%	140	42%	16%	5%	19%	4%	4%	Limited	No
29 GEORGIA	36%	141	51%	9%	5%	16%	5%	5%	Good	No
30 IDAHO	36%	132	50%	13%	4%	18%	3%	2%	Limited	No
31 ARIZONA	36%	129	50%	15%	9%	24%	3%	2%	Fair	No
32 SOUTH CAROLINA	34%	129	54%	2%	2%	6%	5%	4%	Fair	No

	CCPM Recycling Rate with All CCPM	LBS/Capita Recycled	Carboard and Boxboard	PET Bottles	PET Other Rigid	HDPE Bottles	PP Containers	Rigid Plastics #3-7	Data Quality and Availability	Disposal Costs in Top 25% of US
33 INDIANA	34%	125	39%	16%	7%	32%	11%	5%	Fair	No
34 COLORADO	33%	112	49%	8%	2%	14%	3%	2%	Good	No
35 NORTH DAKOTA	33%	136	39%	15%	5%	17%	4%	4%	Limited	No
36 MONTANA	33%	121	46%	12%	4%	16%	3%	2%	Limited	No
37 WYOMING	33%	119	46%	12%	4%	16%	3%	2%	Limited	Yes
38 ILLINOIS	33%	126	41%	12%	2%	17%	3%	2%	Fair	No
39 TEXAS	32%	96	42%	11%	2%	12%	8%	14%	Fair	No
40 WEST VIRGINIA	31%	105	47%	3%	0%	4%	0%	0%	Fair	No
41 OKLAHOMA	29%	105	42%	7%	2%	10%	7%	6%	Limited	No
42 ARKANSAS	28%	105	39%	5%	0%	14%	7%	0%	Fair	No
43 NEW MEXICO	27%	97	38%	10%	3%	14%	2%	2%	Limited	No
44 OHIO	27%	72	32%	11%	2%	16%	4%	2%	Good	No
45 LOUISIANA	26%	97	41%	4%	2%	6%	7%	4%	Limited	No
46 KENTUCKY	24%	90	32%	8%	6%	11%	3%	2%	Fair	No
47 ALABAMA	22%	84	32%	6%	4%	8%	3%	2%	Limited	No
48 TENNESSEE	22%	82	32%	3%	2%	6%	3%	2%	Limited	No
49 MISSISSIPPI	17%	63	24%	4%	3%	6%	2%	2%	Limited	No
50 ALASKA	16%	53	24%	1%	1%	1%	2%	2%	Limited	Yes

STATE-BY-STATE OVERVIEW OF CCPM RECYCLING RATES LISTED ACCORDING TO CCPM RECYCLING RANK



THEME 1

DEPOSIT RETURN SYSTEMS ARE CRITICAL FOR HIGH PERFORMANCE AND THE POLICY IS MOST EFFECTIVE WHEN CURBSIDE AND DEPOSITS WORK TOGETHER

Highest CCPM Recycling Rate

The five states with the highest CCPM recycling rates without cardboard and boxboard have a DRS as well as an established and widespread curbside recycling system in place. In these five states, an average of 63% of all non-cardboard packaging that is recycled comes from the DRS system. Maine, which in 2018 is estimated to have achieved the highest CCPM recycling rate at 74%, also has a DRS that covers the broadest range of beverage and container types in the US. Over 28% of all non-fiber packaging (rigid plastic, glass bottles and jars, and steel and aluminum cans) that is recycled nationally is estimated to be containers that are collected through DRS in 10 states.

Curbside and DRS

It is not possible to reach such high recycling rates through curbside systems alone, as is clearly demonstrated by the performance of these materials in non-deposit states with comprehensive curbside services such as Washington.

Best in Class DRS

A DRS that includes a comprehensive and inclusive range of beverage types and packaging types will deliver higher recycling rates. This is demonstrated by the fact that while Massachusetts and Vermont have complementary DRS and curbside systems in place, their CCPM recycling rates are lower than Maine's and Oregon's; in part, because the scope of the DRS is not as comprehensive (e.g., it does not include non-carbonated water, wines, or spirits). Current U.S. DRS have opportunities to be modernized and significantly increase redemption rates beyond 90%, as is the case in the world's benchmark systems. Current U.S. and best in class DRS are operated under the principles of extended producer responsibility (EPR), whereby producers are paying for the system. Jurisdictions with the highest CCPM recycling rates often have EPR programs that cover curbside services as well as a DRS for beverage containers, such as in British Columbia.

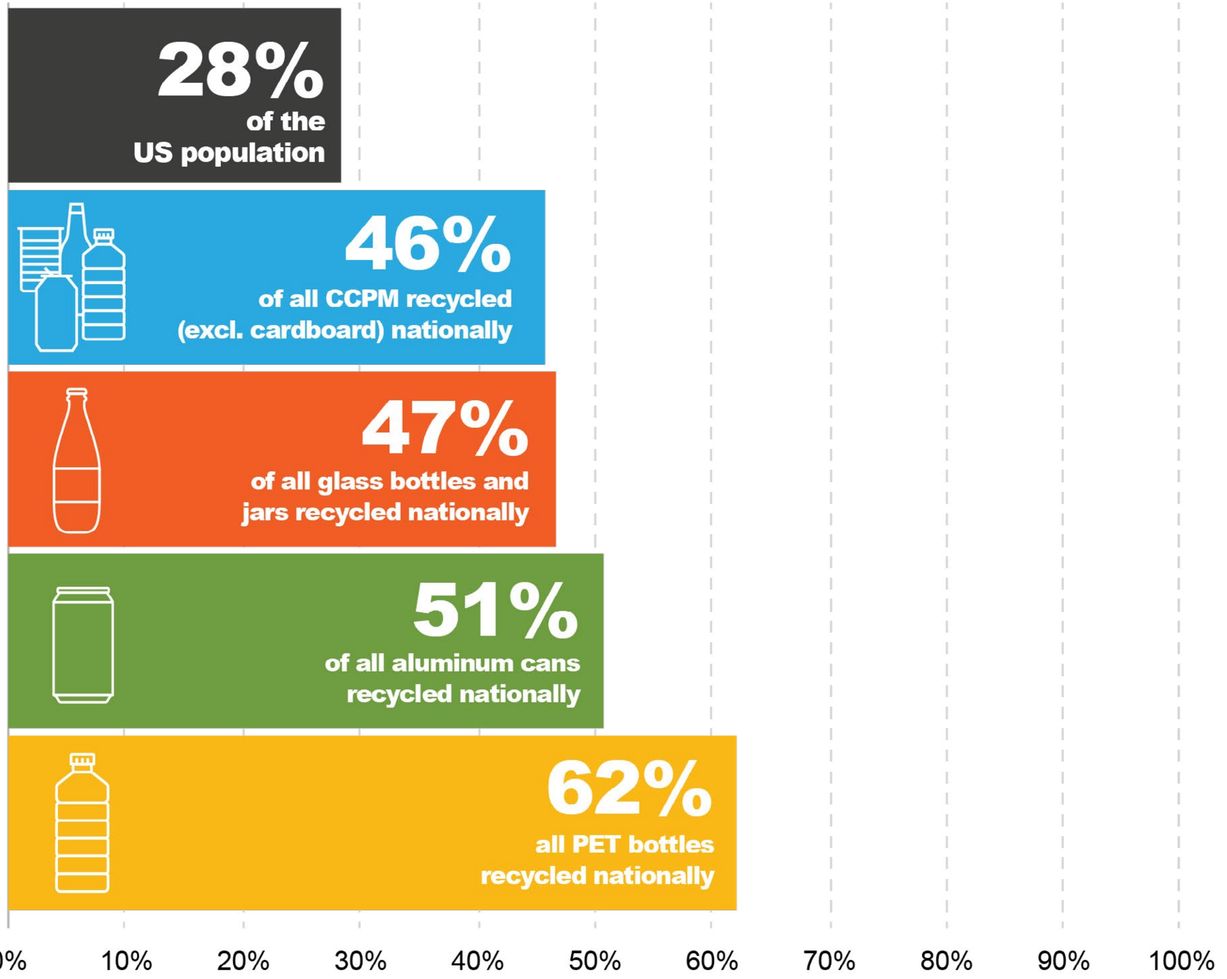
	Recycling Rate *	Bottle Bill	Recycling Legislation
Maine	72%	✓ Yes	✗ No
Vermont	62%	✓ Yes	✓ Yes
Massachusetts	55%	✓ Yes	✗ No
Oregon	55%	✓ Yes	✗ No
Connecticut	52%	✓ Yes	✗ No
New York	51%	✓ Yes	✗ No
Minnesota	49%	✗ No	✗ No
Michigan	48%	✓ Yes	✗ No
New Jersey	46%	✗ No	✗ No
Iowa	44%	✓ Yes	✗ No

Takeaway:

A DRS for beverage containers is necessary to achieve CCPM recycling rates greater than 70%. Policy that requires a DRS delivered under the principles of target-based EPR, either as a standard policy or part of wider EPR policy for all packaging and paper products, will deliver the highest recycling rates.

* *Recycling rates include glass to aggregate and landfill cover*

BOTTLE BILL STATES REPRESENT …



Source: CRI/Eunomia

THEME 2 NOT ALL MATERIALS ARE EQUAL

GHG Recycling Rate

Weight-based metrics are easy to communicate, but they are just one way of measuring a program's success. For a true understanding of the circularity potential of materials, we need to assess the performance of a recycling system not just based on weight, but on the carbon benefits as well (a "GHG recycling rate"). For example, recycling one ton of aluminum has three times the GHG reduction benefits as compared to recycling one ton of cardboard.

Circularity

Keeping the materials in the economy for as many cycles as possible is the ultimate measure of true circularity, as it focuses attention on minimizing virgin resource extraction in the long term. Today, the GHG reduction benefits of recycling a particular material are often only calculated based on one cycle of that material through the recycling system. However, the real benefits are in maximizing the number of times an aluminum can or PET bottle can be collected and recycled without a significant loss in quality so that it can be reused in the manufacture of a new product. Because aluminum can be recycled infinitely, keeping this material in the circular economy for as long as possible through high performing collection systems like DRS, will maximize GHG reductions.[6] Collection and sorting affect the quality of the secondary materials, which is the key factor determining whether the materials are kept in the loop indefinitely, or downcycled into other products to end up in landfill after the second cycle.

Takeaway:

To provide a holistic assessment of the environmental impact, we must assess system performance not only using weight-based metrics, but also other indicators such as GHG emissions. Consider collection, sorting, and recycling systems that lead to high collection rates, low loss rates, and high recycling rates to reduce the GHG emissions associated with the extraction of virgin materials.

The importance of assessing recycling performance and designing programs using different metrics is demonstrated in the graphic on the next page.

ASSESSING RECYCLING PERFORMANCE THROUGH DIFFERENT METRICS

WEIGHT PERSPECTIVE
Tons of CCPM recycled

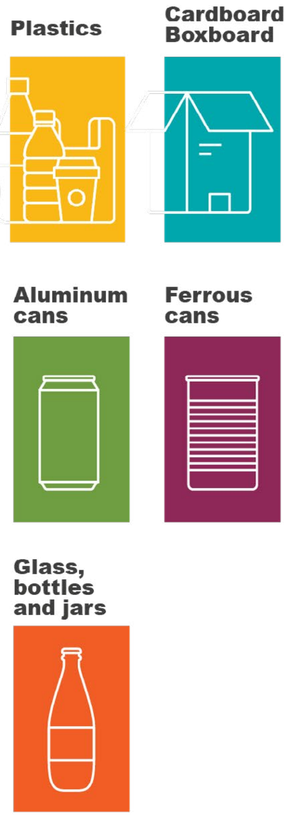
By weight, cardboard and boxboard account for 73% of the total tons of CCPM recycled in 2018, much of this driven from the commercial sector.

GHG MITIGATION PERSPECTIVE
Tons of GHG emissions avoided

Assess system performance using other metrics like GHG emissions avoided to provide a holistic picture of true environmental impact.

VALUE RECOVERED PERSPECTIVE
Revenue from the materials recovered

An increased understanding of the existing markets for recycled materials is essential for public decision-making processes concerning the implementation and evaluation of different categories of recycling policies.



THEME 3

CALCULATING THE REAL RECYCLING RATE

Collection is not Synonymous with Recycling

Downcycling is very different to closed loop recycling. In order to assess the true performance of recycling systems, we must measure the recycling rate, not the collection rate. Today, the quantity of material collected for recycling is often not what is actually processed and recycled into new products. In other words, the collection rate is not the same as the recycling rate.

The only meaningful point at which to measure the quantity of material that is recycled—that is, the real recycling rate—is the point at which it becomes a material that can be re-incorporated into a new product. Figure 1 illustrates at which point in the value chain the real recycling rate can be measured.

The gap between the collection rate and the recycling rate is different for different packaging materials. In 2018, just 32% of non-bottle PET (such as clamshells) collected for recycling is estimated to be recycled across the 50 US states compared to 89% for aluminum cans. In addition to non-target material that is collected at the curbside, losses occur at the sorting facility as well as at the processor. Losses at a MRF can occur for a number of reasons, including inefficiencies in the sorting equipment, which could be linked to:

- The age of the facility and the technologies and sorting equipment for the various packaging streams.
- Non-recyclable material impacting on material shapes or target materials (i.e., flattening 3-D material), reducing the equipment's ability to identify that material.
- Significant quantities of residue remaining in containers, thus increasing their weight and, again, the ability of the equipment to correctly separate the packaging type.

Packaging designs can also play a role in MRF losses. For example, optical sorters typically cannot detect black plastics or full sleeved bottles, and some packaging materials are too small to be detected resulting in them ending up in the residual stream and being disposed. Losses at the processing facility include labels, coatings, caps, and glues.

Figure 2 shows the loss rates that typically occur at a sorting facility and processor and which must be accounted for when determining the real recycling rate, that is, the secondary material that leaves the processor. Figure 2 relates only to material collected at the curbside. The loss rates for beverage containers collected through a DRS is significantly less. For example, for a PET bottle collected through curbside systems there is a 27% combined loss rate at the sorting facilities and processors versus 12% for DRS collected PET bottles.

Material collected also contains moisture, which can be significant for materials such as cardboard in wetter climates, and organic product residues which may be greater for some packaging like yogurt cups, compared to liquid in a beverage container. Moisture, dirt, and residues are not included in Figure 2, but amount to approximately 11% for PET bottles collected through curbside versus 2% for aluminum cans.

FIGURE 1: RECYCLING VALUE CHAIN AND POINTS OF MEASUREMENT

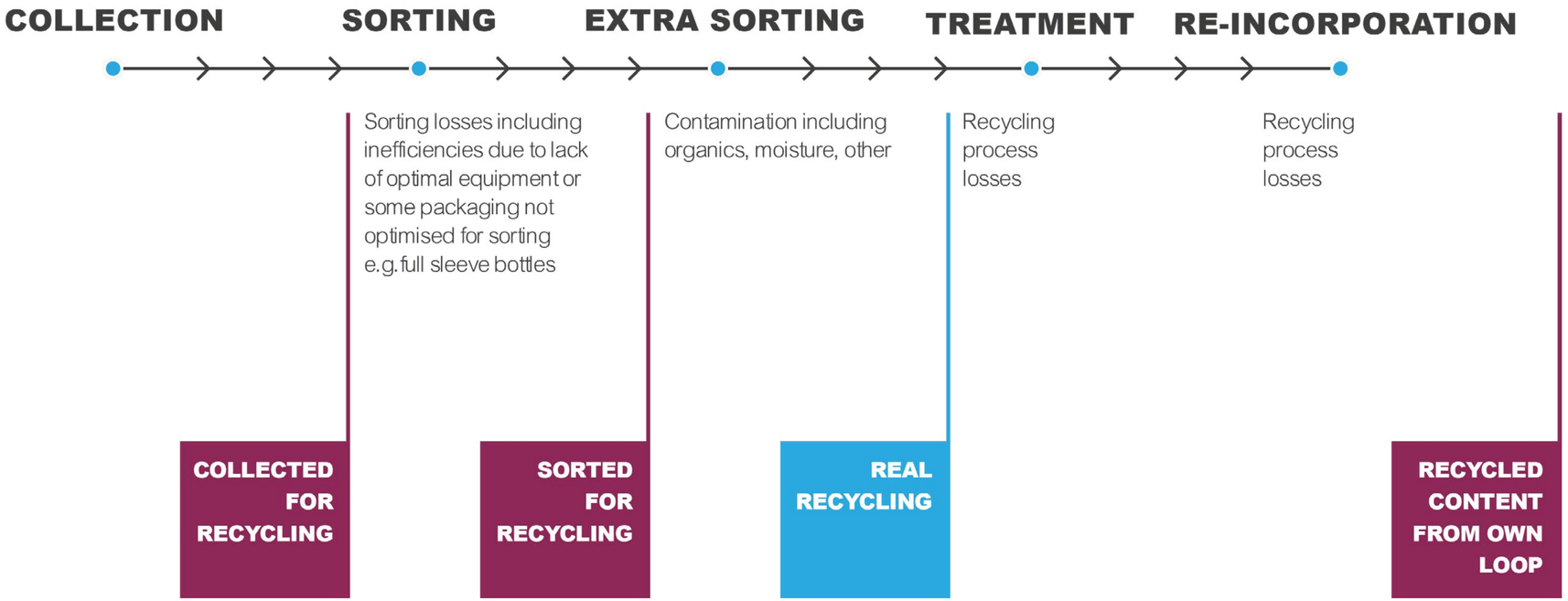
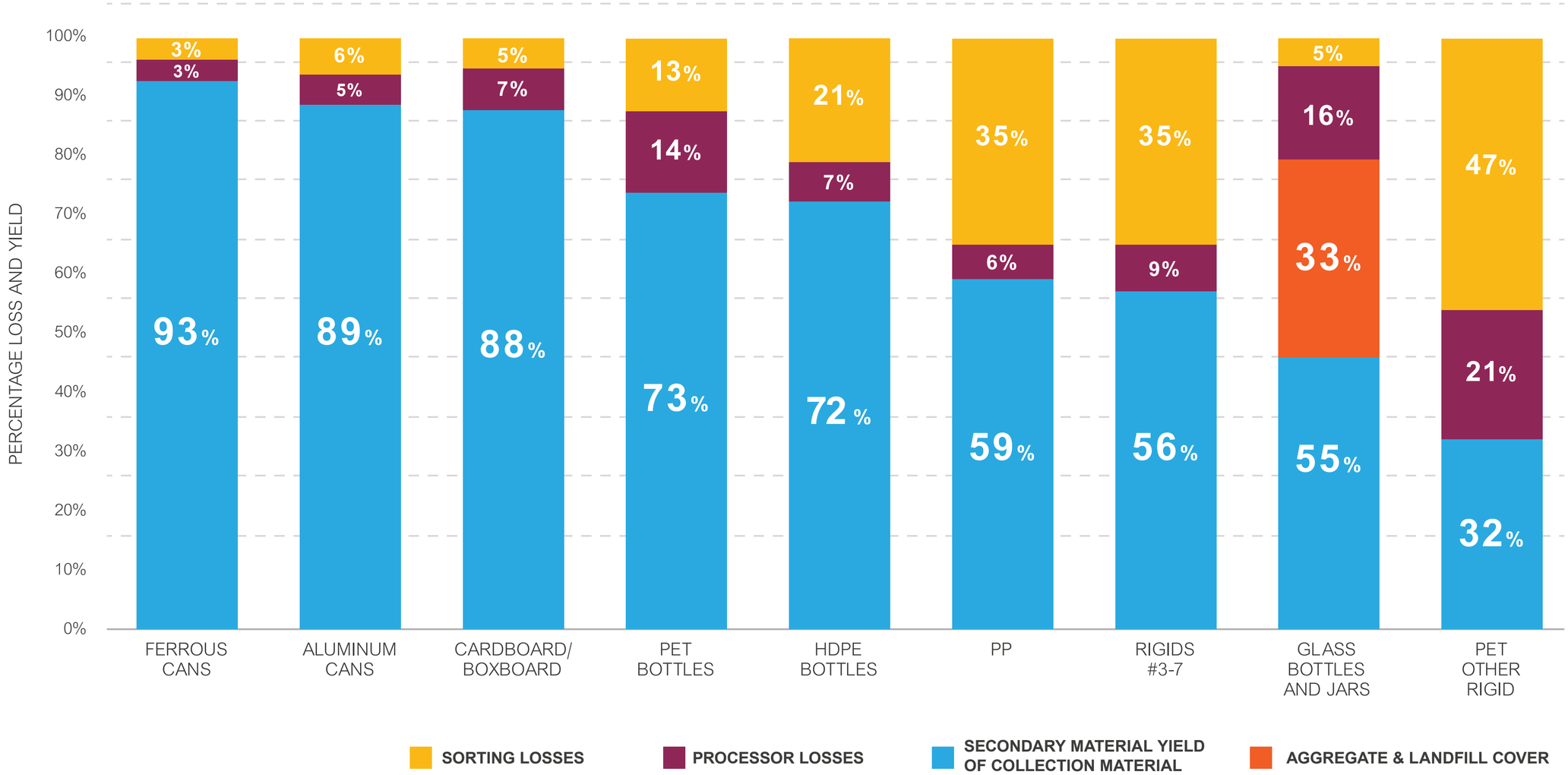


FIGURE 2: TYPICAL LOSS RATES AT A MRF AND PROCESSING FACILITY FOR CCPM, ALONG WITH PERCENTAGE OF MATERIAL THAT BECOMES A SECONDARY MATERIAL



Source: State and municipal-level data, MRF outputs and bale composition and Eunomia discussions with material processors

Closed Loop Recycling

To create a circular economy and, in doing so, reduce GHG emissions, recycled material needs to flow into products that can themselves also be recycled and fed back into the supply chain. The glass recycling rate reported in this study is based on state-reported data where the definition of recycling can include glass that is ultimately used for aggregate, landfill daily cover, or road infill material. None of these activities are closed loop. The impact of discounting this material from both the glass recycling rate and the overarching CCPM recycling rate is significant, as shown below for three states. The difference in Maine is the least out of the three featured states. The primary reason for this is that 88% of glass containers recycled in Maine are collected through the DRS and, due to the quality of this glass, it is more suitable for use in the production of new bottles. Delaware has the greatest impact of the three states. The glass recycling rate drops from 61% to 32% when the data is adjusted to account for material estimated to be sent for use as aggregate or landfill cover. Delaware's glass is collected through curbside services, for which markets in the northeast are limited. The impact in Connecticut is less than in Delaware, but greater than in Maine. Despite Connecticut having a DRS, the program does not include wine and liquor, the consequence of which is that more glass is recycled through curbside services. Expanding the DRS in Connecticut to include wines and spirits will enable more material to go to glass container processors rather than to use as aggregate.

	Glass Bottles and Jars Recycling Rate	Adjust Glass Bottles and Jars Recycling Rate	CCPM Recycling Rate	Adjust CCPM Recycling Rate
MAINE	83%	73%	74%	71%
CONNECTICUT	66%	46%	63%	58%
DELAWARE	61%	32%	59%	54%

Source: Eunomia, State data and NERC[7]

Data from the US EPA vs. Individual States

As part of our recycling rate calculation methodology, the aggregated and adjusted data gathered from cities, counties, and states was compared to national figures reported by the EPA. EPA generation data is calculated using industry produced data (adjusted for imports and exports) and industry and state-level data for recycling. The amount of material calculated as being generated based on state, city, and county-level data was higher for most materials than that calculated by the EPA. Reasons for this have not been investigated in depth, but could include:

1. A level of underestimation in reported generation by industry, stemming from:
   b. Incomplete coverage of producers or imported products;
   c. Underestimation of average product weights;
   d. Differences between material use and final packaging weights, inclusive of additives, labels, caps, etc. (particularly in the case of plastics, where generation estimates are based on resin use); and/or
2. Margins of error within waste composition studies due to the challenges of ensuring a study sample that is sufficiently representative of the diversity of waste streams and sources recorded as municipal solid waste (MSW).

The EPA is currently consulting on what changes might be needed to the national calculation methodology.

Takeaway:

When calculating the recycling rate, it is important to consider what is in the denominator and the numerator. Ideally, recycling rate calculations should be based on the following formula:

$$\frac{\text{Tons of Secondary Material Produced at Material Processor}}{\text{Tons of Material Placed on the Market}} \times 100$$

And not:

$$\frac{\text{Tons of Material Collected for Recycling}}{\text{Tons of Material Generated}} \times 100$$

Requiring producers to report the quantities of material they place on the market, and establishing state coordinated systems for reporting on material sorted and processed, will provide more accurate data upon which to improve programs and direct investment. This can be done as part of EPR policy.

THEME 4 POLICY, REGULATORY AND ECONOMIC DRIVERS YIELD HIGHER RECYCLING RATES

Landfill Fees

Eight of the top 10 performing states also have some of the highest landfill disposal costs on a per ton basis, when assessing on total recycling rate – one more than when assessing the rate without cardboard. The table below shows the landfill tip fees of the 10 states with the highest CCPM recycling rates, eight of which have landfill tip fees in the top quartile for the country. This is predominately due to reduced landfill capacity, which drives up disposal prices. Higher disposal costs make recycling a more viable option because the cost differential is reduced. Environmental fees or taxes such as landfill fees, if set at a high enough level, will reduce the cost differential and support investment in recycling systems.

	CCPM Total Recycling Rate	Rank	Landfill Tip Fee in Top Quartile	Avg Landfill Tip Fee (2018)[9]
MAINE	74.1%	1	YES	$ 78.20
OREGON	66.1%	2	YES	$ 69.58
CONNECTICUT	62.6%	3	YES	$ 71.00*
VERMONT	62.4%	4	YES	$ 120.00**
IOWA	62.1%	5	NO	$ 48.28
NEW JERSEY	61.7%	6	YES	$ 81.96
MINNESOTA	60.4%	7	NO	$ 61.67
PENNSYLVANIA	60.3%	8	YES	$ 69.59
DELAWARE	58.8%	9	YES	$ 85.00
WASHINGTON	58.4%	10	YES	$ 83.44

*Source: Eunomia, *Connecticut based on CSWS MSW Tip Fees[10] ; ** Coventry Landfill, price for 2020[11] | EREF*

Policy Pays Off

States that take a greater regulatory approach to managing waste tend to have higher recycling rates. These approaches include implementing data reporting requirements, material bans, mandatory recycling laws, or disposal surcharges). For example, Vermont, which is the fifth highest performing state in terms of CCPM recycling, passed a Universal Recycling Law in 2012[12] (updated in 2018[13] and 2019),[14] which bans certain items from landfill including cardboard, plastic containers, and cans. More recently, Vermont passed the country's most comprehensive ban on single-use products.

Takeaway:

Mandatory recycling requirements and/or a ban on landfill disposal for selective materials can facilitate high recycling rates. However, it is important to consider the extent to which they can be enforced, since enforcement activities can be resource intensive and costly for government departments. Higher landfill costs created either because of limited space or a result of additional fees act as a lever for equalizing the existing cost disparity between recycling and disposing of waste to landfill. Landfill fees can also raise revenue to further support recycling improvements in programs.

States with the Lowest Per Capita Generation for CCPM (2018)

1. **Washington (262 lbs./capita)**
2. **Ohio (265 (lbs./capita)**
3. **New York (290 lbs./capita)**
4. **Virginia (300 lbs./ capita)**
5. **Alaska (302 lbs./ capita)**

THEME 5 NOT JUST ABOUT RECYCLING, SOURCE REDUCTION CAN DRIVE ENVIRONMENTAL IMPACT

Consumption, Generation, and GHG Impact

For packaging, the most impactful lifecycle stage in terms of GHG emissions is the primary material extraction stage. Therefore, reducing material consumption and, by effect, production, will have the greatest GHG reduction benefits. Reducing the amount of packaging that is generated will also reduce collection, processing, and disposal costs as less material will require end-of-life management. For example, Delaware, which has the highest per capita generation, produces over 50% more CCPM per capita than Washington, the state with the lowest per capita generation.

Takeaway:

To support environmental impact in addition to recycling, packaging producers and brands should focus on reducing the quantity of material generated through changes to packaging design or implementation of alternative delivery models such as reusable or refillable containers, as well as putting systems in place that maximize the capture of high-quality material. Policies such as EPR, if well designed, can facilitate design for recyclability and reuse.

THEME 6 DATA DRIVES RESULTS

Reliable and verifiable data is critical to making effective policy and programming decisions.

States that have more comprehensive and current data, along with a state-managed reporting system, achieve higher recycling rates. Seven of the top 10 recycling states for CCPM have good data quality, availability, and state reporting systems, compared to only two of the ten states with the lowest CCPM recycling rates.

Federal policy is already starting to reflect this identified need. In 2020, the US House of Representatives Appropriations Committee issued House Report 116-448 that included a nationwide Recycling Needs Survey and Assessment in its report language, supporting the EPA "to begin a comprehensive data collection effort to strengthen residential recycling and accelerate the move towards a circular economy," including data on community recycling availability, contamination, and amount of material collected through curbside and deposit programs for recycling. This is a crucial step to understanding what policies, programs, and investments are needed to increase recycling and a strong example of the types of policies needed to support comprehensive data at the state and federal level.

Takeaway:

To support effective decision making when it comes to recycling policy, states need to carry out regular detailed waste characterization studies for both residential and commercial waste streams. These studies should be conducted over a sufficient period of time to account for seasonal variances as well as for different generators.

In addition, states need to set up a system to enable municipalities and waste and recycling facilities in the state to annually report on the amount of material collected, recycled, and disposed of in a consistent way.

Recycling facilities should also report on where material goes after it leaves their facilities, and the material loss rates at those subsequent facilities. This will enable the real recycling rate to be calculated.

THEME 7 TARGETS AND RESPONSIBILITY – VOLUNTARY OR LEGISLATED

Recycling rate and recycled content targets have greater impact if they are supported by legislative or regulatory action such as through a federal or statewide EPR. While several states, such as Montana, Colorado, and Delaware have set diversion or recycling targets, it is important to note that they are mainly aspirational, non-binding, unenforced, and often unmet. It is encouraging to see the work being carried out by the EPA (in consultation with stakeholders) to develop a National Recycling Strategy[15] as well as the commitments being make by producers—either individually or through organizations such as the US Plastics Pact—to design more recyclable packaging and increase recycled content usage by 2025.[16] However, in these efforts there are no consequences if such targets are not met. As a result, there is little incentive for producers to meet these targets, and even less incentive for municipalities and states to invest in recycling programs and infrastructure, especially when there is a lack of funds.

EPR provides a mechanism whereby states can set material-specific targets through legislation and require producers to meet those targets by working with municipalities and their contractors to operate and provide the necessary financial support to establish and run an effective recycling system. Producers of packaging have the most to gain from high-performing recycling systems, as the material collected and recycled can flow into their products, helping them meet recycled content commitments and minimize their carbon footprint. EPR is currently being considered at a federal level in the US as part of the Break Free from Plastics Act,[17] as well as at the state level in several US states.

Takeaway:

Although well-intentioned, voluntary commitments alone will not be sufficient to increase real recycling rates and create a circular economy. Government policies, such as EPR, that set material-specific targets and place the responsibility for meeting those targets on producers over a given period, are more likely to guarantee system improvements and achieve higher performance.

SUGGESTED COORDINATED STEPS FOR ALL STAKEHOLDERS

The intention behind this study is to serve as a springboard for action.

- **For federal and state policymakers, insights demonstrate:**
  - The policies and practices of high-performing recycling states could be adopted in other jurisdictions to achieve better performance.
  - The need for more regular and consistent data on how waste is managed. There is a demand from the public and from industry for better information about resource efficiency. States can respond to this demand by learning from the practices of those states with better quality information and more robust reporting systems. There would also be a benefit to developing greater national consistency in how, and how often, waste management data is published by states – a centralized and standardized electronic reporting system for municipalities and facilities that is open source would be ideal.
- **For the public, insights demonstrate:**
  - An understanding of how their state measures up against others, and for those concerned with improving the environment, the types of policies they can call on their state representatives to adopt to improve performance.
- **For public and private sector waste service providers, insights highlight**
- Those materials that are not being captured, and through comparison with higher performing programs insights can be found as to what service or policy changes could be adopted to improve performance, as well as policies that could improve the services offered to their customers for packaging producers.
- Understanding collection, sorting, and recycling systems is critical for a better packaging design with recyclability in mind.
- The real level of recycling achieved for different packaging materials. It also provides an indication of how performance could be improved, toward the levels of resource efficiency that many producers now aspire, if the policies and practices of the best performing states could be replicated more widely.
- Producers can and should advocate for those policies in other states based on the performance data presented here.

This study is not intended to be a standalone piece of work, but to set a 2018 baseline by which the effectiveness of future services can be tracked, and data reporting compared.

As the study is updated periodically, it is hoped that data availability, quality, and reporting systems become more complete and with greater consistency across states. This will increase the reliability of the results, helping to inform state and regional policy decisions around service needs and drive further investment into the sector.

2 MATERIAL AND STATE TAKEAWAYS

MATERIAL FOCUS

Cardboard and Boxboard

In 2018, cardboard and boxboard packaging represented **61% of CCPM** generated and **73% of CCPM recycled**. The dominance of this material in the waste stream, most likely collected primarily from the commercial sector, and its relatively high recycling rate, masks the performance of other container and packaging materials. This is highlighted for the top five states in the State Focus section below.

Plastics

Of all plastic containers and rigid packaging recycled in 2018, **52% is PET bottles**. Almost half of that percentage comes from the 10 states with DRS programs, which means that approximately **25% of all plastic containers and rigid packaging recycled** in the US in 2018 are PET bottles collected through the deposit programs.

PET and Aluminum Beverage Containers

Nine of the 10 states with the highest recycling rates for PET bottles and aluminum cans are states with a DRS. The average amount of PET recycled (on a lbs. per capita basis) in **DRS states is over 3.5 times greater than in non-DRS states**, and for aluminum it is over three times as great. This disparity occurs even though many of the DRS state programs do not include all beverages. For example, non-carbonated water is currently not included in Massachusetts or Vermont. Ensuring that all DRSs cover the full range of beverages and container types will increase the recycling rate for all beverage containers, but have the greatest impact on plastic bottles.

Glass

Markets for glass collected through single stream curbside collections have been challenging in recent years, with some municipalities dropping glass from services completely. The northeastern states have been hit hard and, as a result, increasingly more curbside collected glass is either being used as landfill daily cover or as an aggregate for road construction. NERC's 2018 "Northeast MRF Glass Survey"[18] found that only 54% of glass collected and processed through the MRFs in the region that responded to the survey went to a glass processor and only **0.02%** to a glass recycling container manufacturer. The remaining glass was either landfilled as **trash (~15%)**, used as alternative daily cover at **landfill sites (~24%)**, or used as **aggregate (~8%)**. The glass recycling rates in this report are based on reported data from states, which includes glass that is used as aggregate and, likely, landfill daily cover. The impact of removing this material from the calculation using data from the NERC report is shown in Figure 3. The impact is greatest in those states that do not have a DRS system, as more material is going through curbside (e.g., Rhode Island and Delaware). States with a DRS, but which do not include wine and liquor (Connecticut and Vermont) are impacted slightly less than those without a DRS, but significantly more than states that have a DRS that includes a broad range of beverages including wine and liquor (Maine).

FIGURE 3: GLASS BOTTLES AND JARS RECYCLING RATE INCLUDING AND EXCLUDING MATERIAL USED AS AGGREGATE AND LANDFILL COVER (2018)

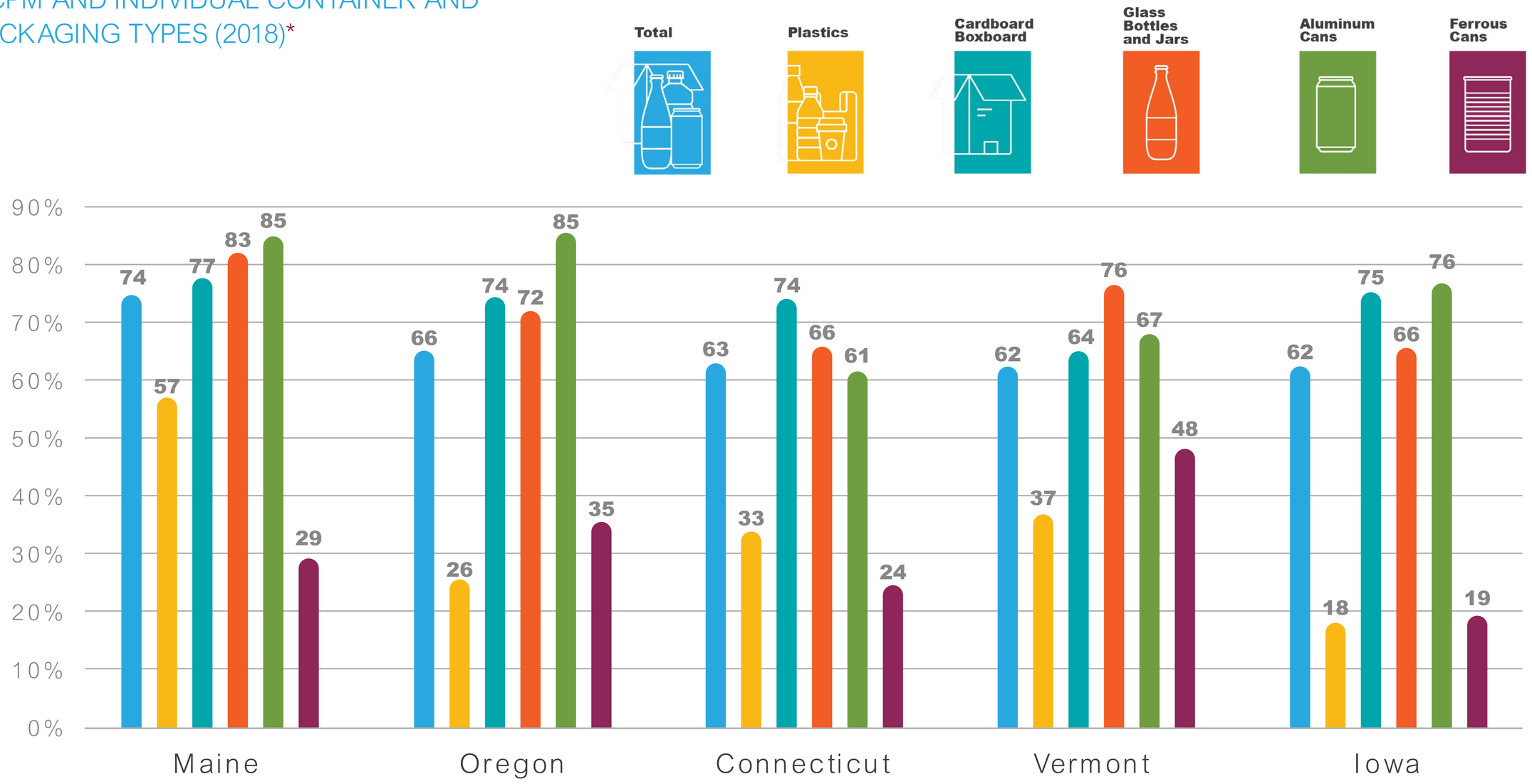
	Glass Bottles and Jars Recycling Rate including Glass used for Aggregate and Landfill Cover	Glass Bottles and Jars Recycling Rate excluding Glass used for Aggregate and Landfill Cover
MAINE	83%	73%
VERMONT	76%	55%
MASSACHUSETTS	71%	50%
CONNECTICUT	66%	46%
NEW YORK	66%	52%
NEW JERSEY	56%	30%
MARYLAND	52%	27%
DELAWARE	61%	32%
RHODE ISLAND	47%	25%
PENNSYLVANIA	44%	23%
NEW HAMPSHIRE	38%	20%

STATE FOCUS

Top 5 CCPM Recycling States including Cardboard and Boxboard

The five states with the highest combined recycling rate for CCPM in total are presented in Figure 4. It is useful to review the top states including cardboard and boxboard in order to compare the recycling rates of this material compared to others in the top performing states, noting the especially high volume of this material. The figure also identifies the recycling rate for individual packaging materials and shows that in three of the five states, aluminum cans have the highest recycling rate.

FIGURE 4: RECYCLING RATE FOR ALL CCPM AND INDIVIDUAL CONTAINER AND PACKAGING TYPES (2018)*



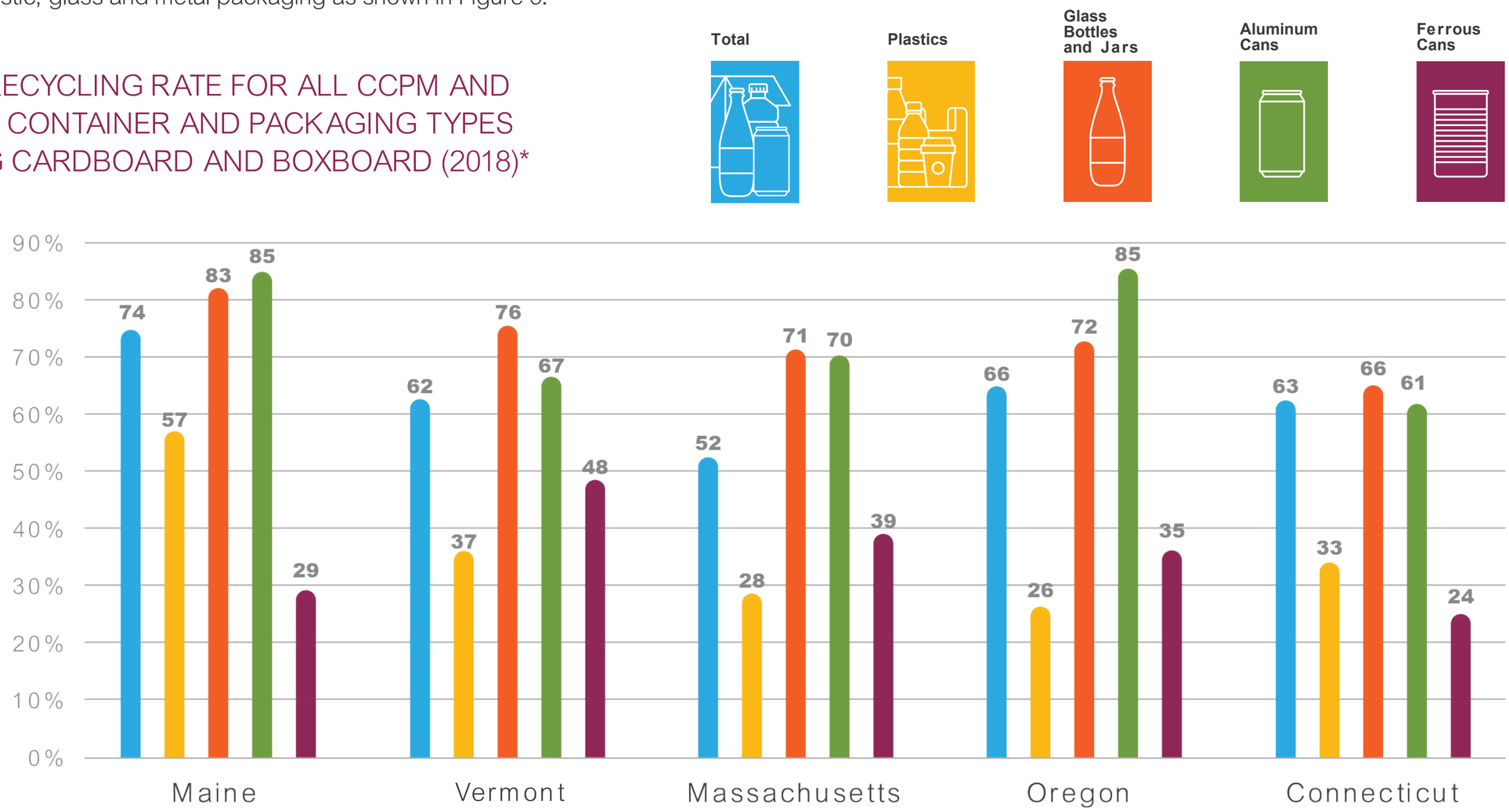
* *All glass figures include glass used for aggregate and landfill cover.*

Source: Eunomia calculation using state, city, county, MRF output and bale specifications, material processor data.

Top 5 CCPM Recycling States excluding Cardboard and Boxboard

The result of removing cardboard and boxboard from the CCPM is that all five of the top five states are DRS states, demonstrating the value of operating of a DRS in the collection of plastic, glass and metal packaging as shown in Figure 5.

FIGURE 5: RECYCLING RATE FOR ALL CCPM AND INDIVIDUAL CONTAINER AND PACKAGING TYPES EXCLUDING CARDBOARD AND BOXBOARD (2018)*



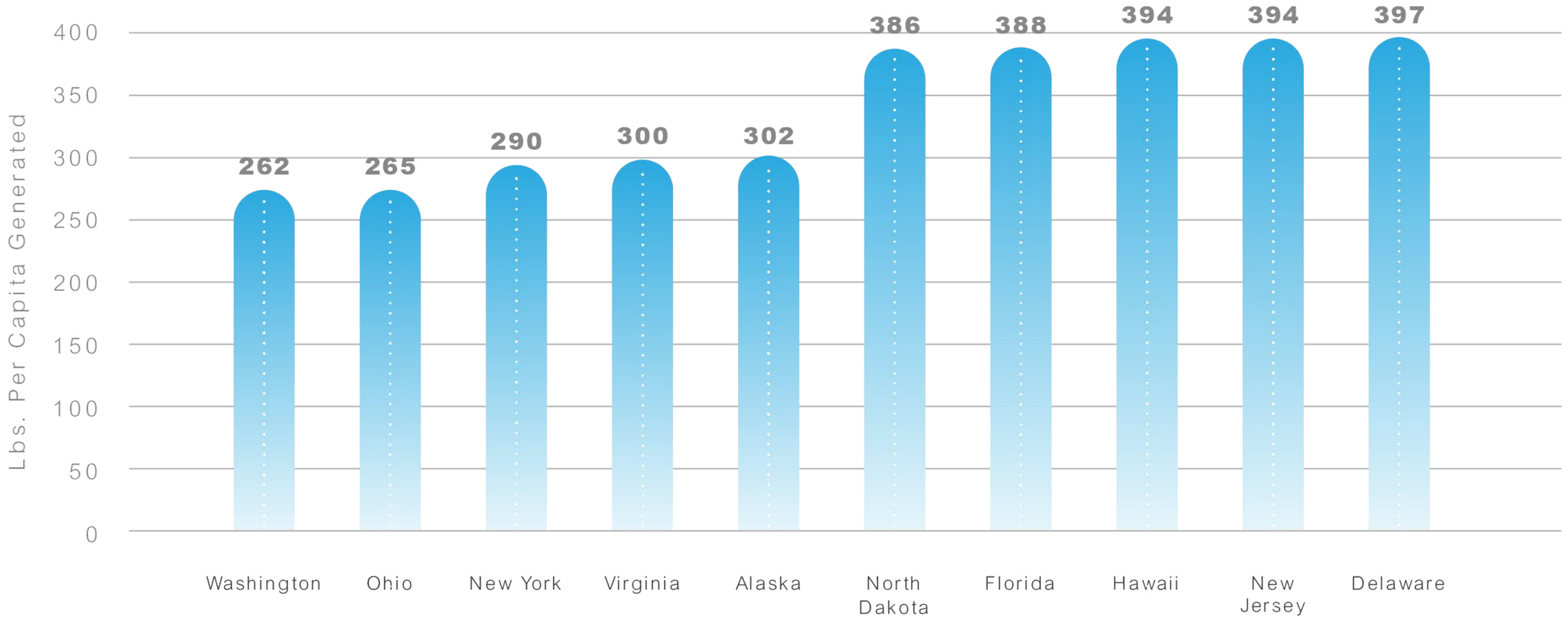
* *All glass figures include glass used for aggregate and landfill cover.*

Source: Eunomia calculation using state, city, county, MRF output and bale specifications, material processor data.

Highest and Lowest per Capita Generation

Packaging generation is directly linked to consumption; the more packaging that is consumed, the more CCPM that is generated. Because significant GHG emissions are generated in the production of packaging and products, the less CCPM that is generated, the greater the GHG benefits. Figure 6 shows the five states with the lowest (on the left) and highest (on the right) per capita material generation rates. The figure shows that Delaware produces over 50% more CCPM per capita than Washington.

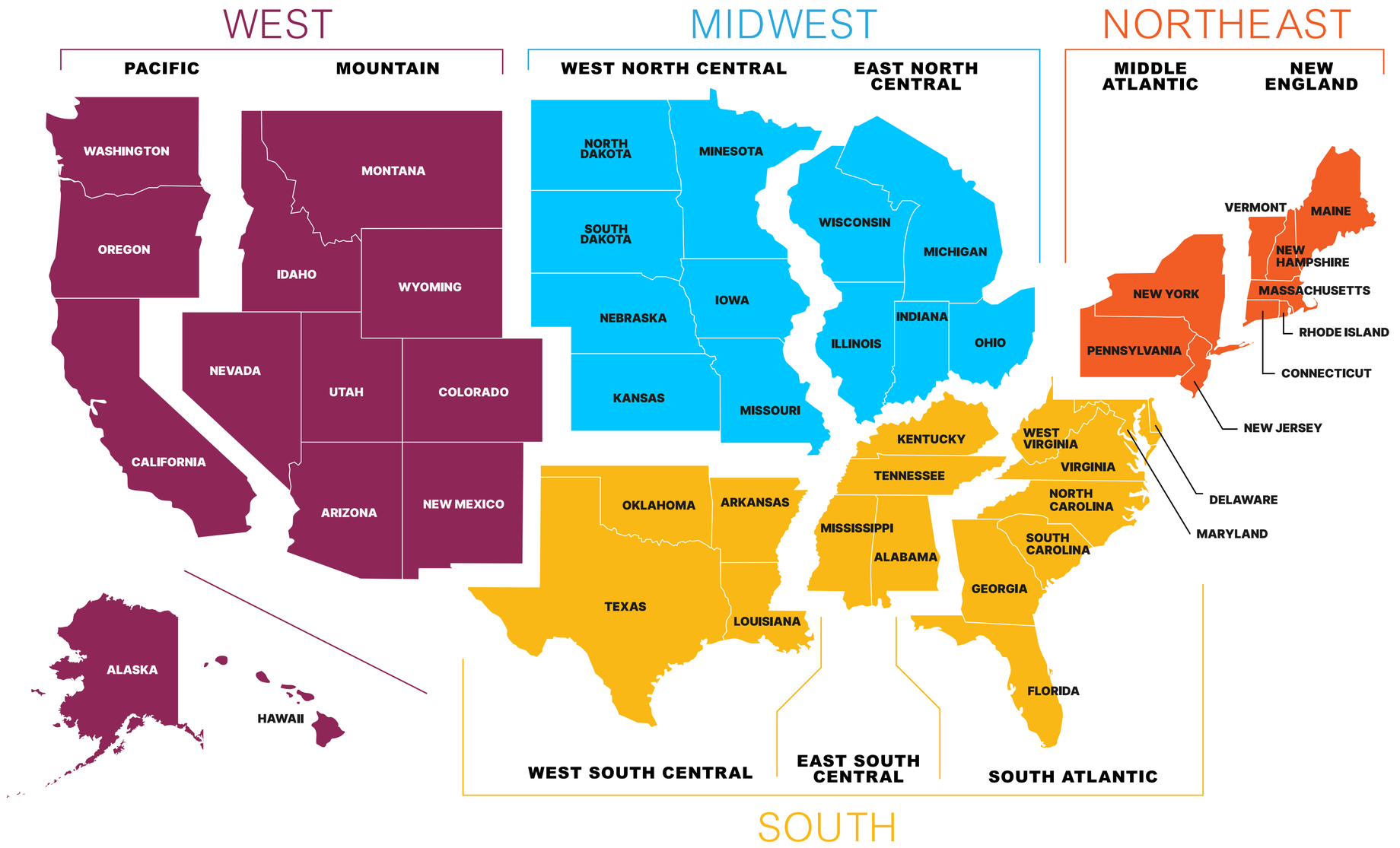
FIGURE 6: HIGHEST AND LOWEST PER CAPITA CCPM GENERATING STATES



STATE-BY-STATE RESULTS

3

REGIONS



Source: US Census Bureau

METRICS FOR A CIRCULAR ECONOMY

The following metrics are presented for each state.

WEIGHT-BASED METRICS

Three weight-based metrics have been calculated:

CCPM Generated

The amount of CCPM generated is a barometer of how well waste minimization mechanisms are working. The amount of CCPM generated is impacted by:

- Levels of consumption, which traditionally are linked to the buoyancy of the economy and affluence levels;
- Effectiveness of upstream activities (e.g., packaging design) at minimizing the amount of packaging needed to protect each product and to display it attractively;
- Measures to reduce single-use packaging and to transition to more circular delivery models, such as refill; and
- Decisions made by consumers at the point of purchase as to whether they will purchase products that have more packaging than is necessary.

CCPM Recycled

The amount of generated CCPM that is effectively recycled reflects:

- The extent to which recycling programs are in place and utilized; and
- The effectiveness of those programs at collecting, sorting, and processing CCPM into a secondary material feedstock.

Not all material collected for recycling becomes a secondary material feedstock that can be manufactured into new products. In addition to non-target material collected at the curbside, there are losses at the sorting stage in the MRF as well as at the processor. These losses have been estimated such that a real recycling rate is presented. The only meaningful point at which to measure the quantity of material that is recycled—that is, the real recycling rate—is the point at which it becomes a material that can be re-incorporated into a new product. Further detail on the process used to adjust for losses is provided below and in the separate Technical Appendix.

CCPM Disposed

The amount of CCPM disposed is a direct reflection of the missed opportunity to recirculate materials in a circular economy and is an indicator of the inadequacies of current waste management systems to manage the packaging stream as efficiently as possible, which results in valuable resources being landfilled or incinerated.

PERFORMANCE BASED METRICS

Recycling Rate

The recycling rate is a measure of the percentage of material generated, or placed on the market by producers, which makes its way into a new product. It is not a measure of the amount of material that is collected, or the amount processed at an MRF. For each state, an overall CCPM recycling rate is provided plus an individual recycling rate for each CCPM.

Rank

Each state is ranked according to:

- Its recycling rate for all CCPM.
- Its recycling rate for all CCPM excluding cardboard and boxboard. Due to the weight of cardboard compared to other packaging materials when included in packaging recycling rate calculation, it masks the performance of other packaging materials. When removed, the performance of other materials can be assessed.
- Pounds per capita generated, recycled, and disposed.

States that recycled the greatest amount of CCPM in terms of pounds per capita, are ranked higher on recycling performance. Conversely, the states with the least amount of CCPM generated and disposed in terms of pounds per capita, are ranked highest on these measures. This ranking system reflects the goal that states should strive to generate less material in total, recycle as much of it as possible, and therefore dispose of the fewest pounds per capita of CCPM as possible.

DATA QUALITY

For each state, indicators are provided to identify differences in terms of data availability, quality, and the extent to which data is centrally managed by the state. Each state's data was qualitatively scored against the following data-based indicators:

- Data availability and quality:
  - Availability: The extent to which necessary data was available at the state, county, city, or municipality level.
  - Quality: How complete, granular, and up-to-date the data was, as reported. For example, the extent to which data covers residential (single-family and multi-family) and commercial sectors; or, if the waste characterization study reports on plastics by polymer type (e.g., PET, HDPE, etc.) or just by rigids and flexibles.
- Centrally managed data systems: State requirements regarding what, if any, data is reported centrally to the state and by whom (e.g., municipalities, waste, and recycling facilities, etc.).

The precise scoring mechanism for all metrics is provided in the separate Technical Appendix

METRICS FOR A CIRCULAR ECONOMY

Key statistics, summaries of the study results, and key takeaways for each state are presented below. Each state is summarized in accordance with the format below, which provides sources for statistics and explanations of the information presented.

KEY FACTS

- POPULATION — 2019 State Populations (U.S. Census)
- PERCENT URBAN — 2010 Urban Percentage of Populations (U.S. Census)
- CENSUS SUB-REGION
- EPA REGION — EPA Regions, 1-10 (U.S. EPA)

Census Sub-Regions:
- New England
- Mid-Atlantic
- East North Central
- West North Central
- South Atlantic
- East South Central
- West South Central
- Mountain
- Pacific

PERFORMANCE

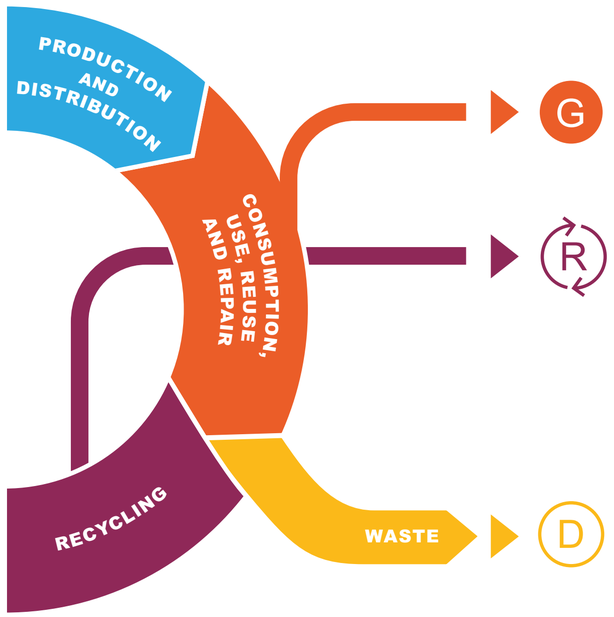
- CCPM RECYCLING RATE — % of CCPM recycled of total CCPM generated
- CCPM GENERATION RANK — National rank in generation of CCPM, 1=highest generation
- CCPM RECYCLING RANK — National rank in recycling of CCPM, 1=best recycling rate
- CCPM RECYCLING RANK Without Cardboard — National rank in recycling of CCPM without cardboard, 1=best recycling rate
- CCPM DISPOSAL RANK — National rank in disposal of CCPM, 1=lowest disposal

DATA

- AVAILABILITY AND QUALITY — The extend to which necessary data was available at the state, city, county, or municipality level, and how complete, granular, and up-to-date data is, as reported. Limited, Fair, or Good.
- SYSTEMS — The requirements of the state on what, if any, data is reported centrally to the state and by whom (e.g., municipalities, waste, and recycling facilities, etc.). None, Basic, or Good.

CIRCULAR ECONOMY METRICS

Lists the estimated total state wide tonnage and per capita weight of packaging generated, recycled and disposed anually.



PACKAGING GENERATED
0.85 million tons
349 lbs per capita

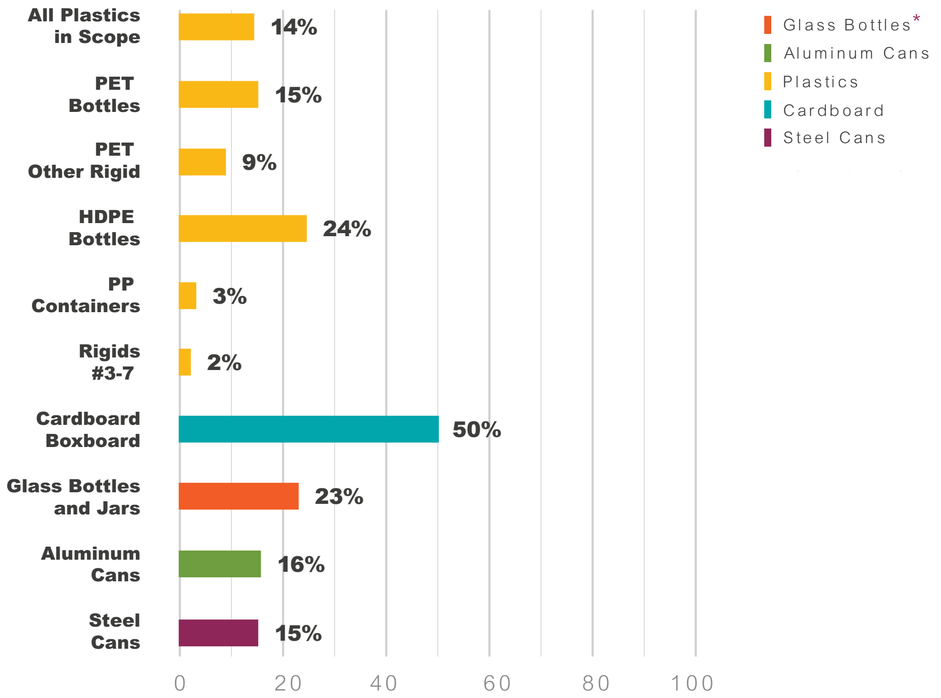
PACKAGING RECYCLED
0.21 million tons
84 lbs per capita

PACKAGING DISPOSED (LANDFILL/INCINERATION)
0.65 million tons
265 lbs per capita

METRICS FOR A CIRCULAR ECONOMY

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES

Graphs of the recycling rate for each CCPM material type including plastics, cardboard/boxboard, glass bottles and jars, aluminum cans, and steel cans. The plastic category is broken down further into PET Bottles, PET Other Rigid, HDPE Bottles, PP Container, and Rigids #3-7



DATA

Lists data sources to calculate packaging generated, recycled, and disposed. If data is limited, then methods used to estimate the figures are listed.

KEY TAKEAWAYS

Summarizes key takeaways relating to recycling, generation, and disposal in the state, including how those figures compare to relevant states/regions. Also summarizes key takeaways relating to data quality and availability in the state. And includes areas of potential improvement for data collection and reporting systems.

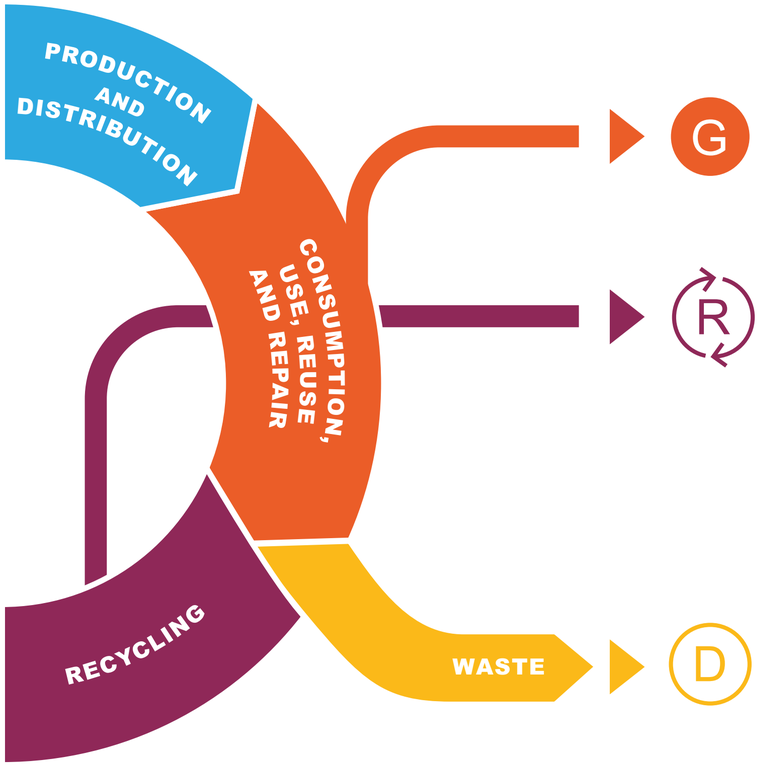
* *All glass figures include glass used for aggregate and landfill cover.*

ALABAMA

KEY FACTS

POPULATION	**4,903,185**
PERCENT URBAN	**59%**
CENSUS SUB-REGION	**East South Central**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**22%**
CCPM GENERATION RANK	**28**
CCPM RECYCLING RANK	**47**
CCPM RECYCLING RANK without Cardboard	**43**
CCPM DISPOSAL RANK	**48**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.85 million tons
349 lbs per capita

PACKAGING RECYCLED
0.21 million tons
84 lbs per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.65 million tons
265 lbs per capita

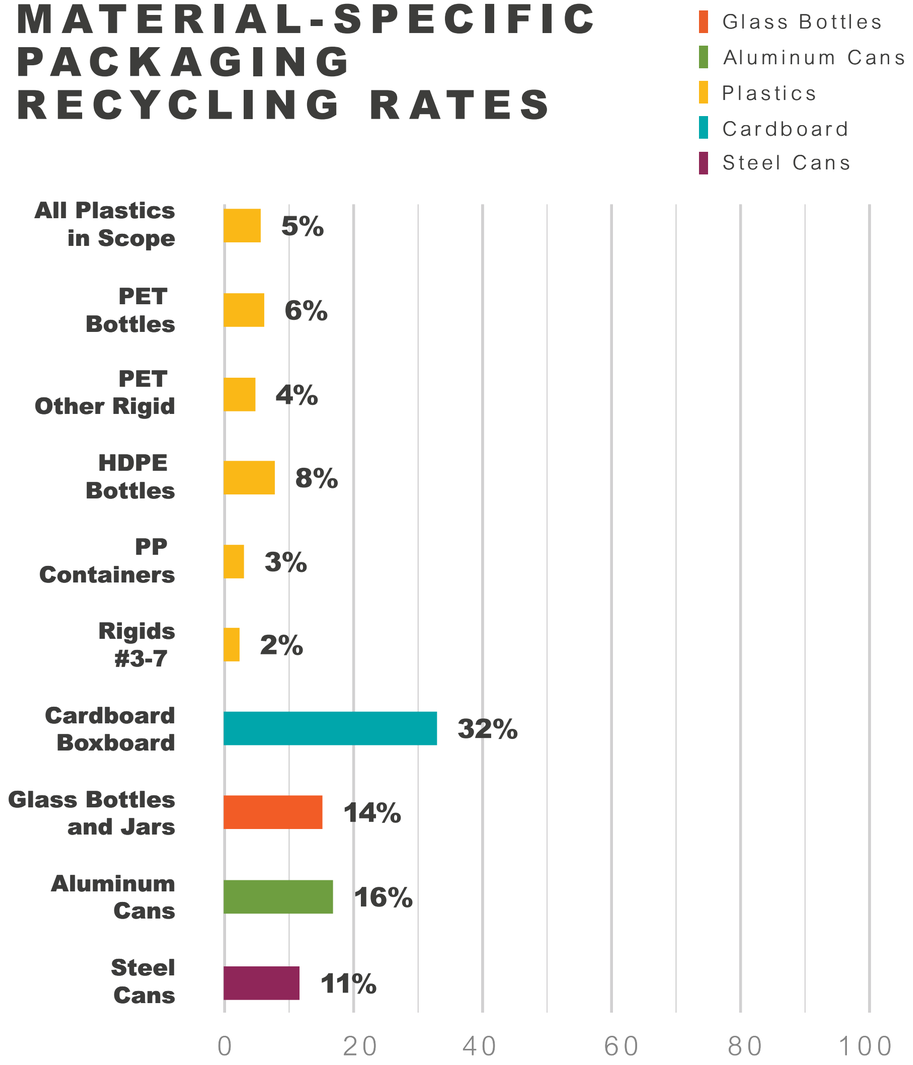
ALABAMA

OVERVIEW

The Alabama Department of Environmental Management (ADEM) oversees statewide waste management rules and regulations, which are written into Division 13 of the ADEM Administrative Code, pursuant to Alabama Code §§22-27-1 to 22-27-49. The State has a non-binding statutory waste reduction goal of 25%, set through its 2008 Solid Wastes and Recyclable Materials Management Act.[19]

In 2016, the Southeast Recycling Development Council and ADEM partnered with the Alabama Recycling Partnership to commission "The Plan for Boosting Residential Material Recovery", which reported that only 25% of residents had access to curbside recycling and proposed expanded recovery of recyclables. It is unclear whether the recommendations were implemented.[20]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



ALABAMA

DATA

Alabama's data is limited to MSW tonnages published in a 2018 biennial Solid Waste Report [21]. The amount of CCPM recycled was estimated using EPA and comparable state data and applying the process set out in the Calculation Appendix.

KEY TAKEAWAYS

Recycling

- Alabama's CCPM recycling rate is ~22%, making it one of the five worst performing recycling states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~11%. This is considered to be in the mid-range for southern states.
- The average landfill fee for Alabama is slightly below the average for the southern states. At this level, there is little if any financial incentive to invest in recycling.

Generation and Disposal

- Alabama generates ~349 lbs./capita/year of CCPM putting it near the median of per capita generation compared to other states in the nation. With its recycling rate of ~22%, this leads to ~265 lbs./capita/year disposed making it among the 20% of states that dispose of the most material.
- Alabama sends more material to landfill than the average for the states in the southern region.

Data

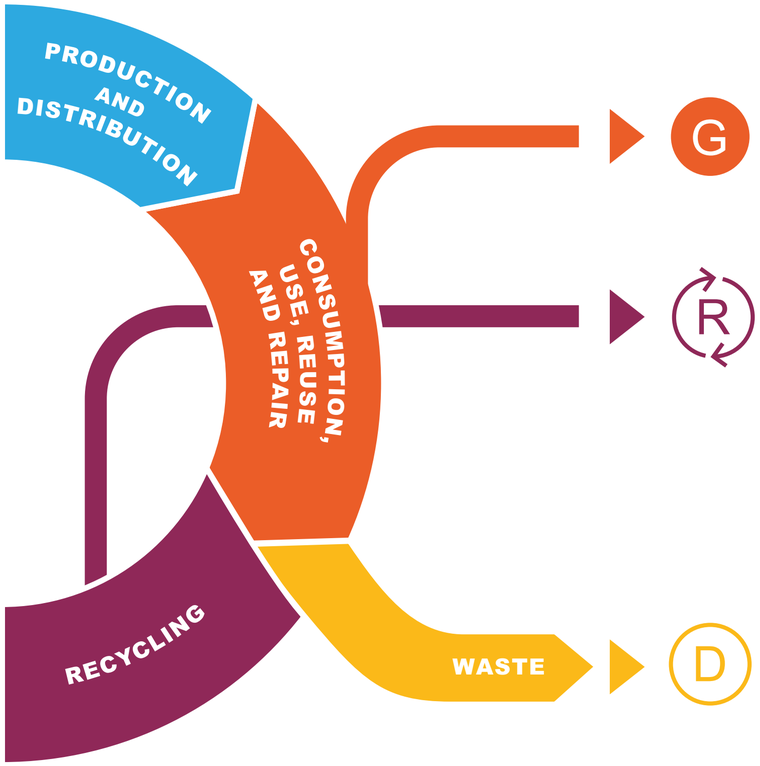
- Alabama should consider conducting a statewide waste characterization study to better understand waste composition in the state. It should also consider expanding the data reporting system for municipalities and waste and recycling facilities to track performance over time and provide an indication of the effectiveness of any intended improvements in the recycling system.

ALASKA

KEY FACTS

POPULATION	**731,545**
PERCENT URBAN	**66%**
CENSUS SUB-REGION	**Pacific**
EPA REGION	**10**
PERFORMANCE	
CCPM RECYCLING RATE	**16%**
CCPM GENERATION RANK	**5**
CCPM RECYCLING RANK	**50**
CCPM RECYCLING RANK without Cardboard	**48**
CCPM DISPOSAL RANK	**44**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.11 million tons
302 lbs per capita

PACKAGING RECYCLED
0.02 million tons
53 lbs per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.09 million tons
249 lbs per capita

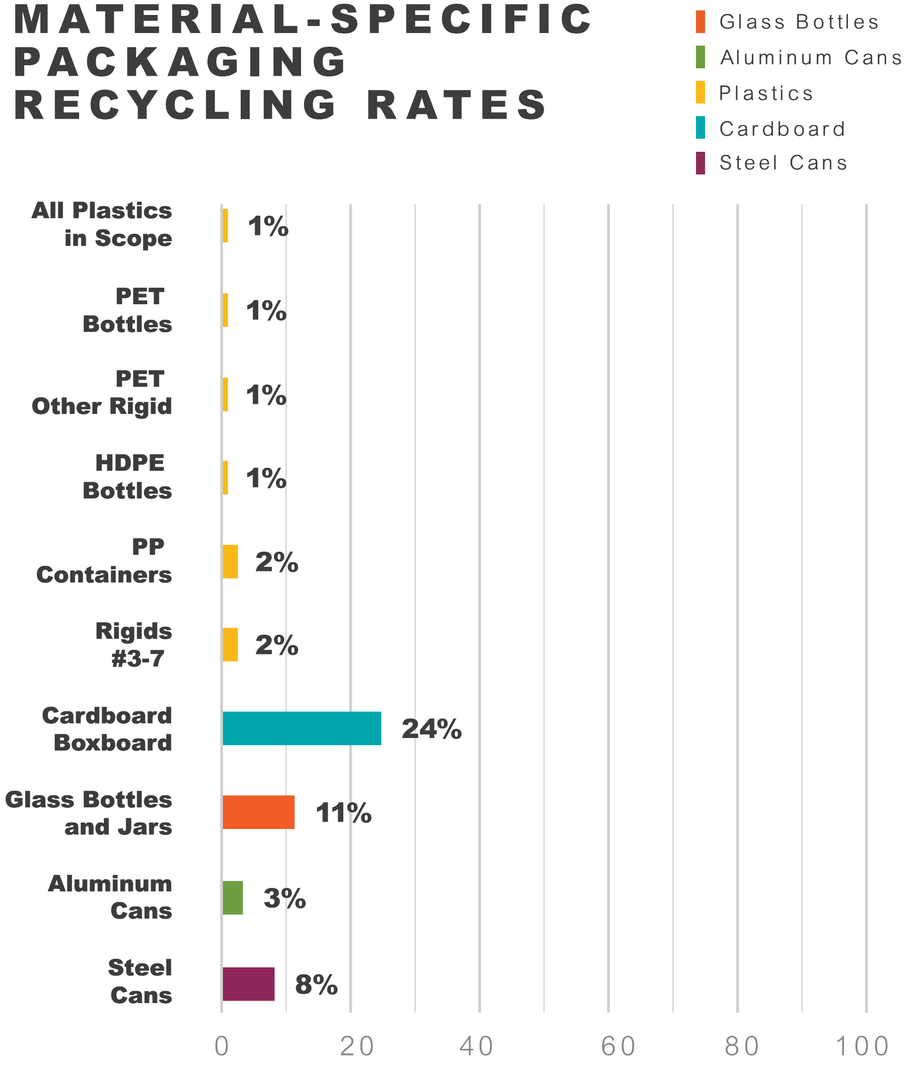
ALASKA

OVERVIEW

The Alaska Department of Environmental Conservation oversees statewide waste management rules and regulations. There are state grants available to target litter and resource recovery for municipalities and non-profit organizations [22], and waste reduction and recycling awards for schools.[23]

Recycling in Alaska faces unique challenges due to the small population, distance to markets and transportation costs. Though there are few state programs, many local governments implement programs targeting specific materials such as backhaul programs for rural areas that target e-waste and the "Flying Cans" program, which is run by Alaskans for Litter Prevention & Recycling.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



ALASKA

DATA

Recycling and MSW tonnage data are available for Fairbanks, Anchorage and for some rural communities. There is limited statewide data and no systems for regular reporting. There is a focus in the state on data related to fishing and marine debris.

KEY TAKEAWAYS

Recycling

- Alaska's CCPM recycling rate is ~16%, which is the lowest in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~6%.

Generation and Disposal

- Alaska generates ~302 lbs./capita/year of CCPM, which is among the 10 lowest generating rates in the nation.
- However, Alaska's low recycling rate leads to a disposal rate of ~248 lbs./capita/year, which is among the 10 highest disposal rates in the nation and the highest of all western states.
- The average landfill fee for Alaska is the highest in the nation.

Data

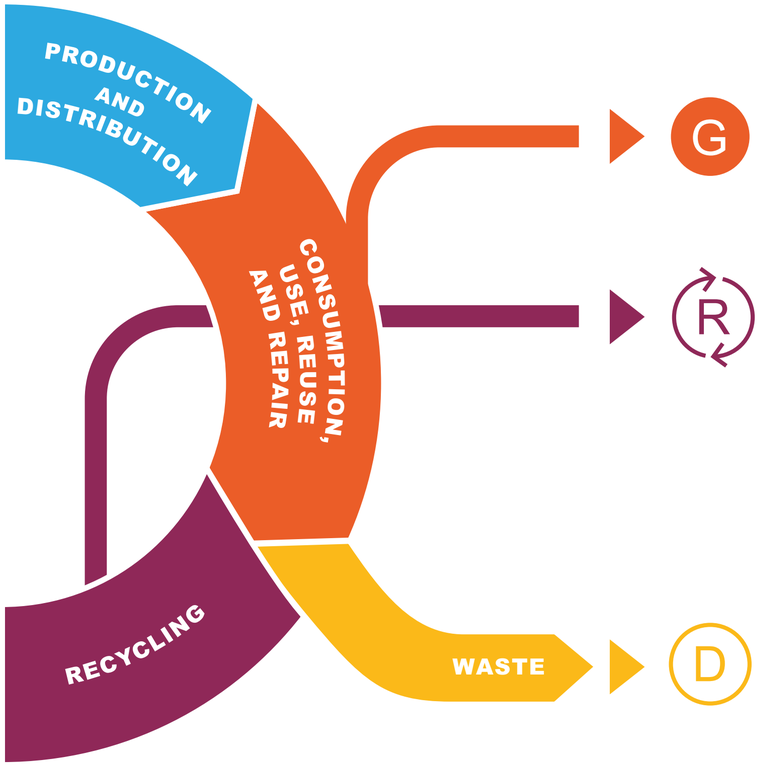
- Alaska should consider carrying out a waste characterization study to better understand waste composition in the state. The state should also consider setting up a data reporting system for municipalities and waste and recycling facilities to track performance over time and provide an indication of the effectiveness of any intended improvements in the recycling system.

ARIZONA

KEY FACTS

POPULATION	**7,278,717**
PERCENT URBAN	**90%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**9**
PERFORMANCE	
CCPM RECYCLING RATE	**36%**
CCPM GENERATION RANK	**10**
CCPM RECYCLING RANK	**31**
CCPM RECYCLING RANK without Cardboard	**33**
CCPM DISPOSAL RANK	**21**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.16 million tons
325 lbs per capita

PACKAGING RECYCLED
0.46 million tons
129 lbs per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.70 million tons
196 lbs per capita

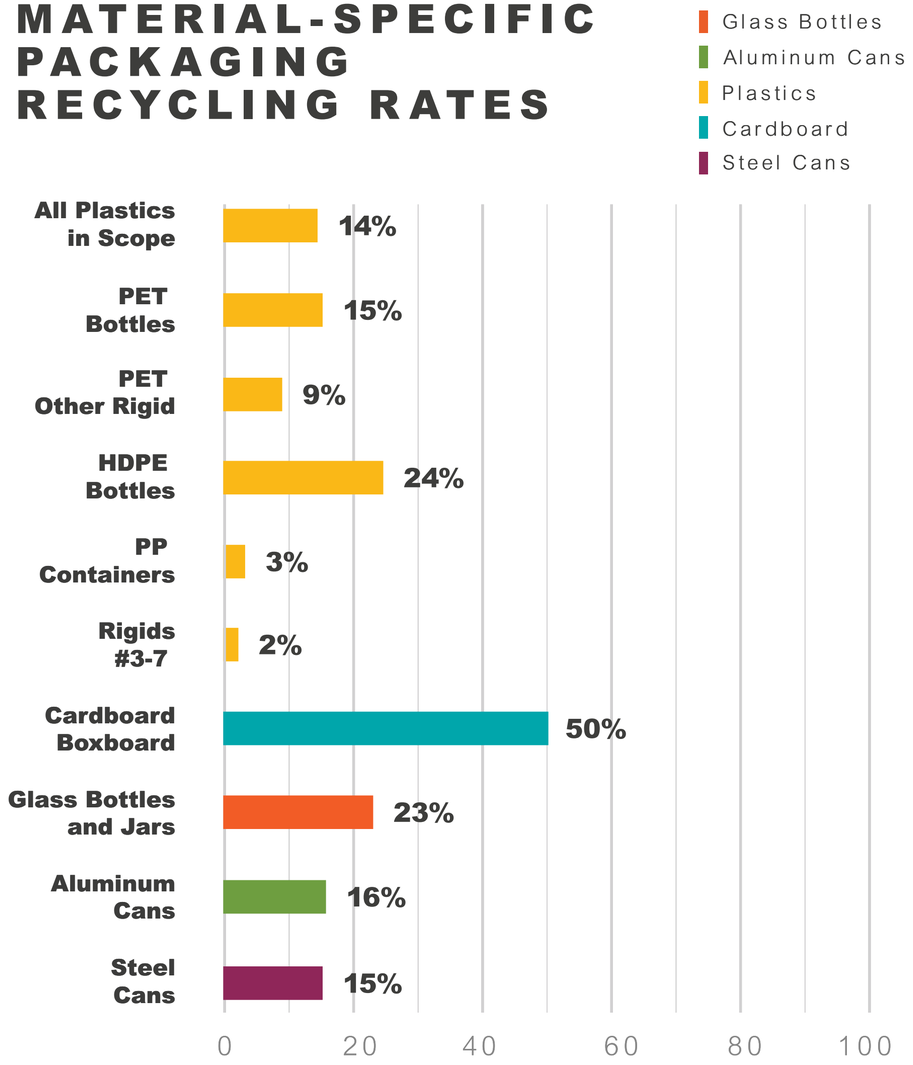
ARIZONA

OVERVIEW

The Arizona Department of Environmental Quality (DEQ) oversees solid waste and recycling for the state, though all services are provided at the local government level. The DEQ provides guidance on community programs, with dedicated program support for local e-waste collection and food waste prevention. [24]

Arizona has a preemption law (2015 SB 1241) that prevents cities and towns from banning plastic grocery bags or disposable containers or charging for them. [25]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



ARIZONA

DATA

Arizona captures voluntary recycling data from all municipalities, counties, and tribes in the state.[26] The most recent publication provides recycling estimates for 2019. However, since this report is based on a voluntary survey, several counties and recycling facilities failed to respond, making the data incomplete. Tonnages for waste disposed to landfill are available from 2015 to 2017, however there is no statewide MSW composition data available. The City of Phoenix, the state capital, commissioned a waste characterization study in 2015.[27]

KEY TAKEAWAYS

Recycling

- Arizona's CCPM recycling rate is ~36%, which is among the 20th lowest performing states in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~17%.
- Arizona's recycling rates with and without cardboard and boxboard are both below average for the western states.

Generation and Disposal

- Arizona generates ~325 lbs./capita/year of CCPM, which is among the 10 lowest generating rates in the nation.
- Arizona's average recycling rate leads to a disposal rate of ~196 lbs./capita/year, which is also around the median for the nation.
- Arizona's average landfill fee is below average for the western states and unlikely to incentivize increased waste diversion.

Data

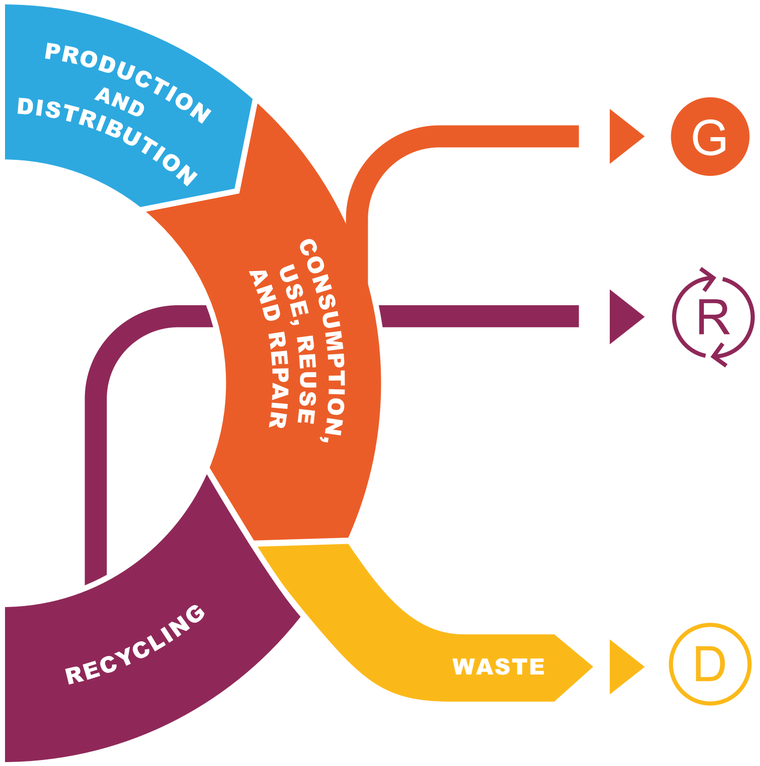
- Arizona should consider conducting a statewide waste characterization study to better understand waste composition in the state. The state should also consider expanding and mandating their currently voluntary data reporting system for municipalities and waste and recycling facilities to track performance over time and provide an indication of the effectiveness of any intended improvements in the recycling system

ARKANSAS

KEY FACTS

POPULATION	**3,017,804**
PERCENT URBAN	**56%**
CENSUS SUB-REGION	**West South Central**
EPA REGION	**6**
PERFORMANCE	
CCPM RECYCLING RATE	**28%**
CCPM GENERATION RANK	**19**
CCPM RECYCLING RANK	**42**
CCPM RECYCLING RANK without Cardboard	**38**
CCPM DISPOSAL RANK	**41**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.51 million tons
340 lbs. per capita

PACKAGING RECYCLED
0.16 million tons
105 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.35 million tons
234 lbs. per capita

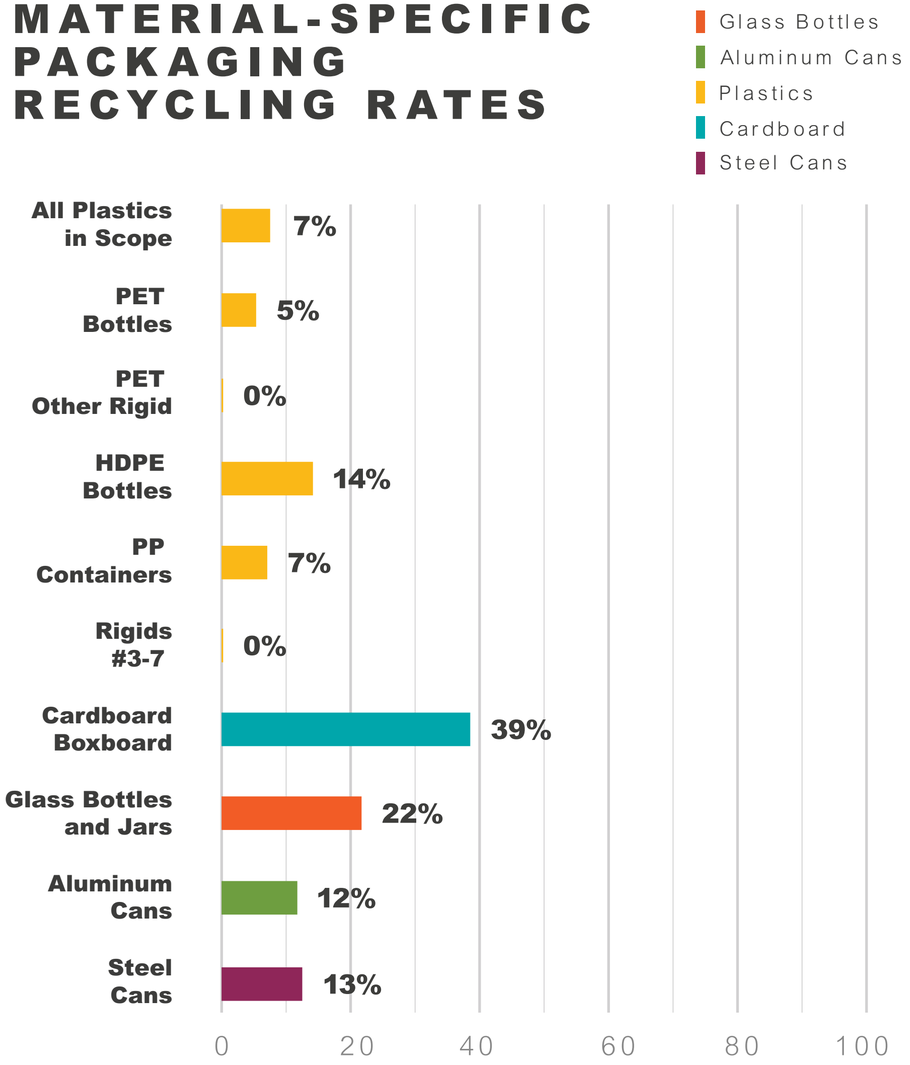
ARKANSAS

OVERVIEW

The Arkansas Division of Environmental Quality (ADEQ) oversees solid waste and recycling for the state. The ADEQ provides technical review and assistance to solid waste facilities during the permitting process, monitors groundwater near landfills, supervises landfill closures, and regulates composting facilities and transfer, waste recovery, and waste tire processing stations. [28]

While Arkansas has introduced deposit return legislation for beverage containers several times since 2007, it has never passed any. The latest effort in 2019 (HB1771: Arkansas Litter Reduction and Deposit Beverage Container Recycling Act), would have created a state agency to oversee the program and applied a $0.05 deposit to covered containers.[29]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



ARKANSAS

DATA

Arkansas published an annual state of recycling report, the most recent of which was published by the ADEQ for 2017.[30] This report provides statewide recycling tonnages for a range of material categories, with statewide waste generation and landfill estimates. County recycling programs are required to report amounts of materials recycled by weight and volume annually. There is limited information regarding the composition of disposed MSW.

KEY TAKEAWAYS

Recycling

- Arkansas' CCPM recycling rate is ~28%, which is among the 10 lowest performing states in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~14%, which is about the average for the southern states.

Generation and Disposal

- Arkansas generates ~340 lbs./capita/year of CCPM, which is below the national average.
- Arkansas disposes of ~234 lbs./capita/year of these materials, which places it among the 10 states that send the most material to landfill.
- The average landfill fee for Arkansas is below the national average and the average of southern states.

Data

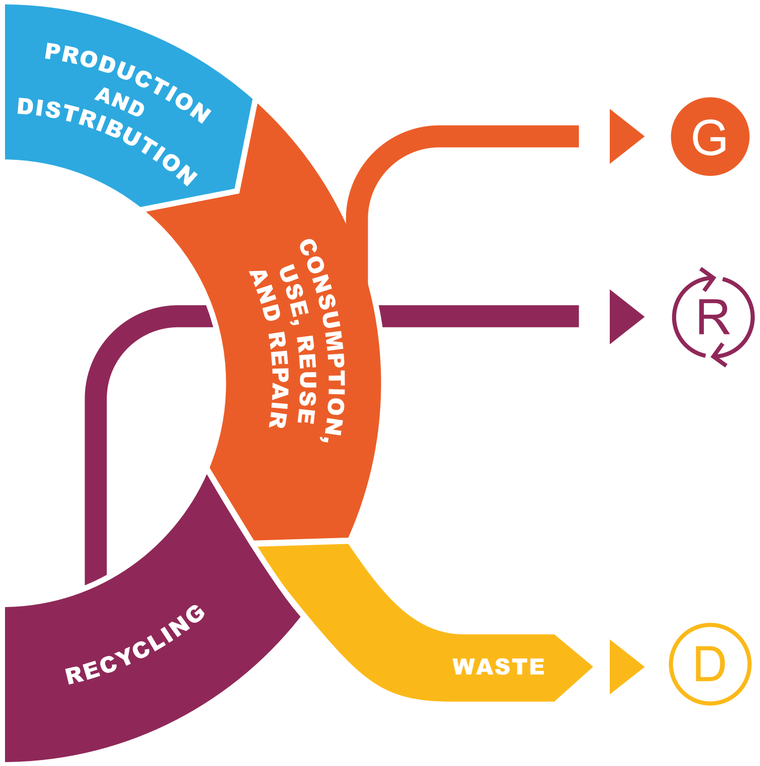
- Arkansas should consider undertaking a MSW waste characterization study to better understand waste composition in the state. The state should also consider expanding their data reporting requirements and include waste and recycling facilities to track performance over time and provide an indication of the effectiveness of any intended improvements in the recycling system.

CALIFORNIA

KEY FACTS

POPULATION	**39,512,223**
PERCENT URBAN	**95%**
CENSUS SUB-REGION	**Pacific**
EPA REGION	**9**
PERFORMANCE	
CCPM RECYCLING RATE	**54%**
CCPM GENERATION RANK	**41**
CCPM RECYCLING RANK	**13**
CCPM RECYCLING RANK without Cardboard	**11**
CCPM DISPOSAL RANK	**15**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
7.41 million tons
376 lbs. per capita

PACKAGING RECYCLED
4.02 million tons
204 lbs. per capita

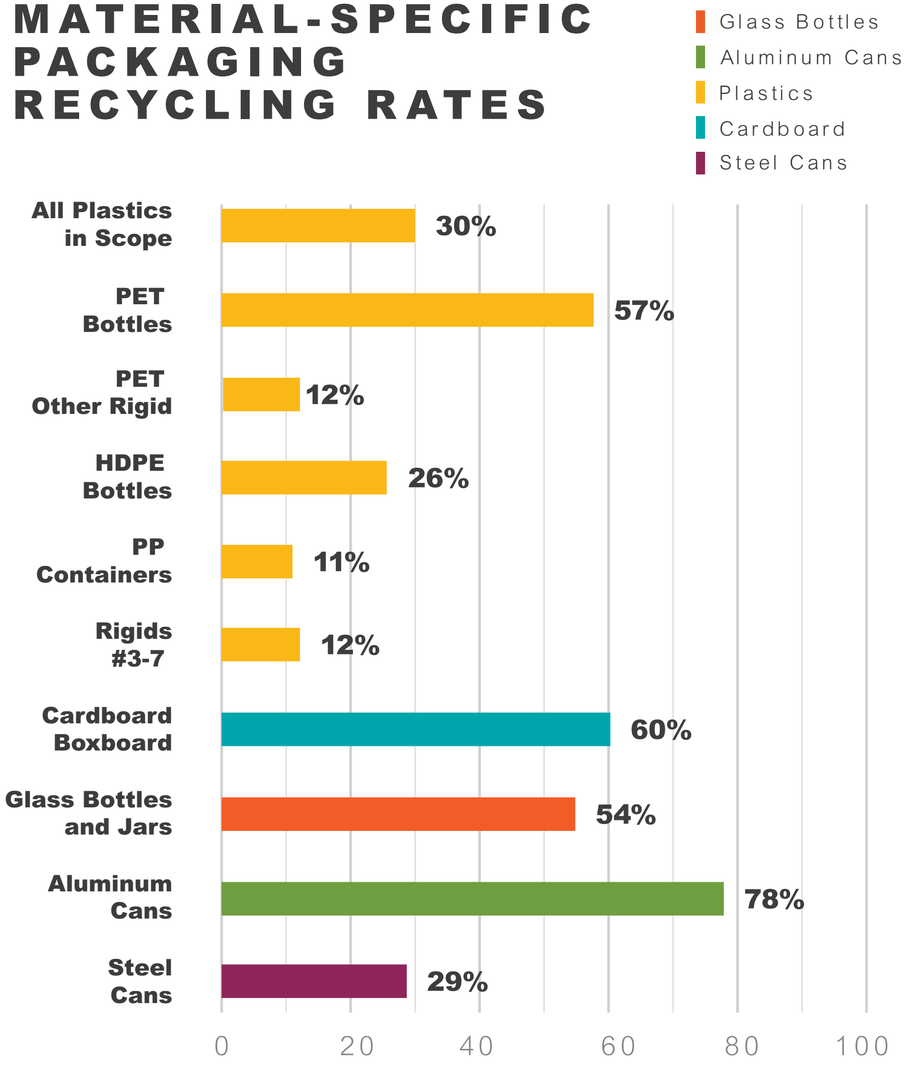
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
3.40 million tons
172 lbs. per capita

CALIFORNIA

OVERVIEW

As a sub-department of the California Environmental Protection Agency (CalEPA), the Department of Resources Recycling and Recovery (CalRecycle) oversees the collection of recycling within the state. [31] California is one of 10 states in the US with a bottle bill, has legislation imposing a fee on material sent to landfill, and also has a recent law that creates new recycling infrastructure development programs. [32] All of this, combined with the fact that it is a large and populous state, has meant that California has extensive and well-developed recycling infrastructure, leading to a relatively high recycling rate.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



CALIFORNIA

DATA

CalRecycle produces annual reports on its specific programs (beverage containers, tires, etc.) and on the state of recycling and disposal in California. Therefore, California's calculated recycling rate is based on recent data publicly available via the state agency.

Data availability in California is reasonable, with recent MSW composition analyses for most waste streams, but there is a notable gap in recycled tonnage data for single-family households. New legislation has created a detailed reporting obligation for MRFs, so quality and reliability of data will improve significantly from 2020 onwards. [33]

KEY TAKEAWAYS

Recycling

- California's CCPM recycling rate is ~54%, which ranks 13th in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~44%, which ranks eleventh in the country, indicating that the impact of cardboard and boxboard is lower than in some other states.
- ~72% of the recycled rigid plastics packaging, glass bottles and jars, and steel and aluminum cans come through the state's DRS.
- California's recycling rates for materials included in its DRS are relatively high, including ~57% for PET bottles, ~54% for glass bottles and jars, and 7~8% for aluminum cans.

Generation and Disposal

- California generates ~376 lbs./capita/year of CCPM, which is among the 10 states generating the most CCPM. The high recycling rate mitigates the impact of this generation to some degree, with ~204 lbs./capita/year disposed. This rate places California among the top 20 states in terms of least amount of material disposed, but its high generation rate tempers the impact of the high recycling rate in terms of diverting material from disposal.
- California's average landfill fee is higher than the national average, but near the average for the western states.

Data

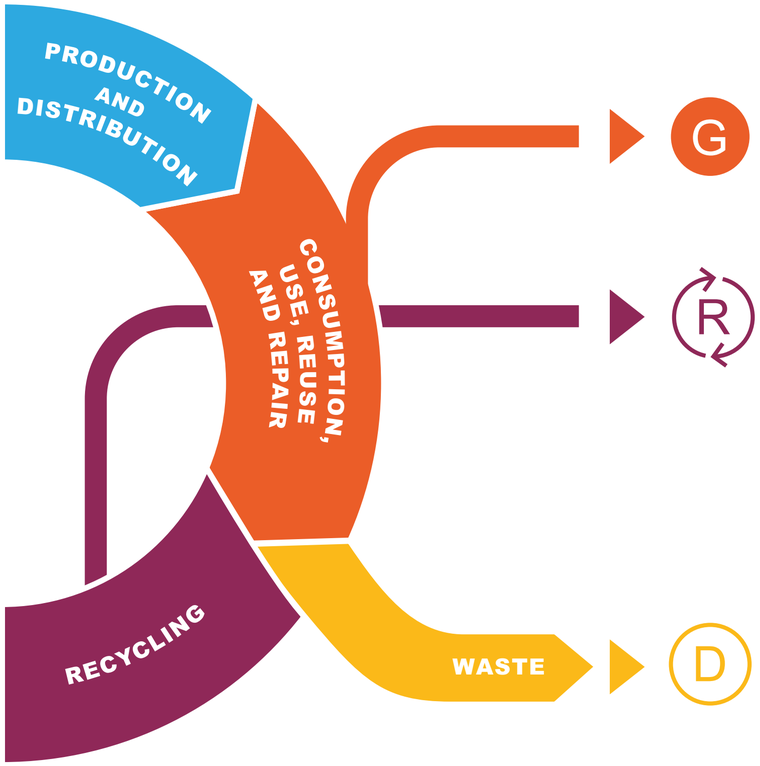
- CalRecycle's extensive data reporting has likely contributed to California being one of the highest performance states for CCPM. Nevertheless, it should look to address the gap on recycled tonnages from single-family households.
- The expansion of reporting requirements to MRFs is likely to allow California to have more insight into the material that is being recycled and to better address poor performing materials.

COLORADO

KEY FACTS

POPULATION	**5,758,736**
PERCENT URBAN	**86%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**9**
PERFORMANCE	
CCPM RECYCLING RATE	**33%**
CCPM GENERATION RANK	**21**
CCPM RECYCLING RANK	**34**
CCPM RECYCLING RANK without Cardboard	**35**
CCPM DISPOSAL RANK	**37**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.97 million tons
341 lbs. per capita

PACKAGING RECYCLED
0.32 million tons
112 lbs. per capita

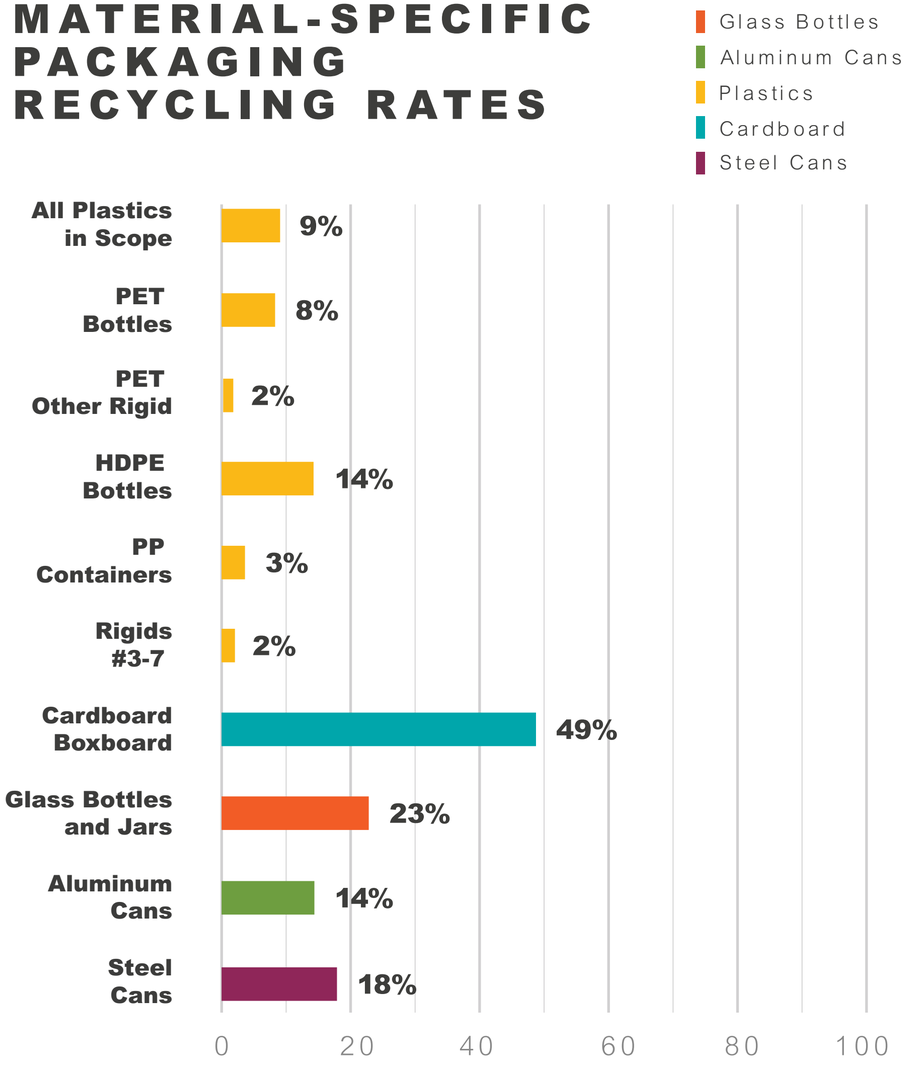
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.65 million tons
229 lbs. per capita

COLORADO

OVERVIEW

Colorado Department of Public Health and Environment (CDPHE) has oversight of all waste management and recycling activities in Colorado. The 2016 Colorado Integrated Solid Waste & Materials Management Plan developed recommended waste diversion goals at the state and local levels for the next twenty years; in summary the statewide diversion target is 45% by 2036. [34]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



COLORADO

DATA

Data provision in Colorado is very good. CDPHE reports disposal and diversion tonnages by relatively detailed material categories and by generator on its webpage on an annual basis, beginning in 2018.[35] A recent (2018) statewide composition of disposed MSW is also publicly available, providing compositions for rural counties, urban counties and statewide.[36] It should be noted that, despite publishing accessible and detailed data, reporting is not mandatory at a municipal level and therefore several authorities do not collect data.[37] In spring 2019, CDPHE sent The Recycling Partnership's MRF contamination survey to 22 MRFs in Colorado, of which 12 responded.

KEY TAKEAWAYS

Recycling

- Colorado's CCPM recycling rate is ~33%, which is among the twenty lowest performing states in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars and steel and aluminum cans is ~16%.
- Colorado's recycling rates with and without cardboard and boxboard are both below average for the western states.

Generation and Disposal

- Colorado generates ~341lb/capita per year of CCPM, which is around the median of the nation.
- Colorado's below average recycling rate leads to a disposal of ~229lbs/capita per year, which is among the 20 worst performing states in the nation and more than average for the western states.
- The average landfill fee for Colorado is below average for the western states and unlikely to incentivize increased waste diversion.

Data

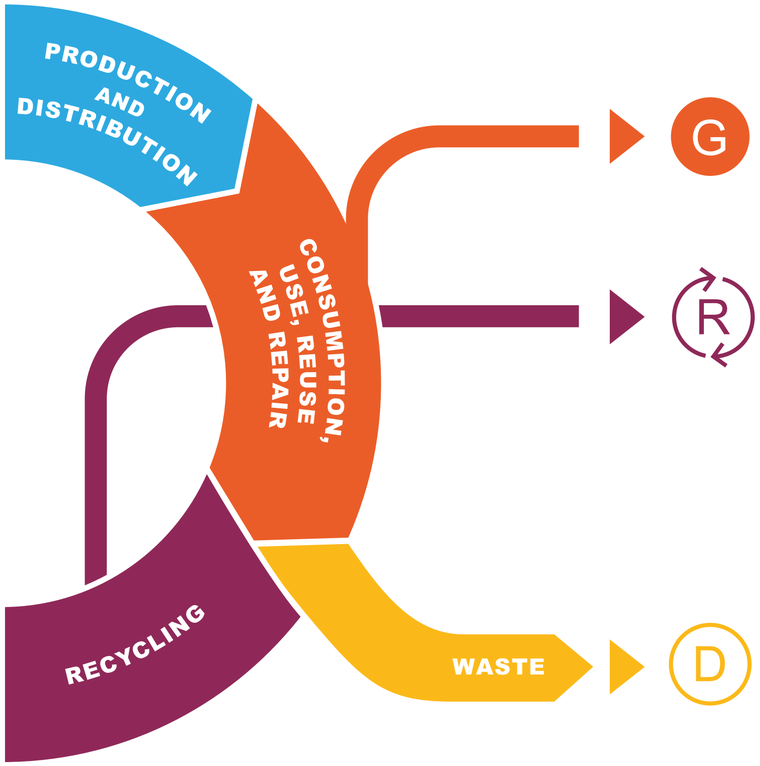
- Colorado has a comprehensive data system but should consider expanding and mandating their currently voluntary data reporting system for municipalities and waste and recycling facilities.

CONNECTICUT

KEY FACTS

POPULATION	**3,571,520**
PERCENT URBAN	**88%**
CENSUS SUB-REGION	**New England**
EPA REGION	**1**
PERFORMANCE	
CCPM RECYCLING RATE	**63%**
CCPM GENERATION RANK	**45**
CCPM RECYCLING RANK	**3**
CCPM RECYCLING RANK without Cardboard	**5**
CCPM DISPOSAL RANK	**7**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.68 million tons
382 lbs. per capita

PACKAGING RECYCLED
0.45 million tons
252 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.23 million tons
129 lbs. per capita

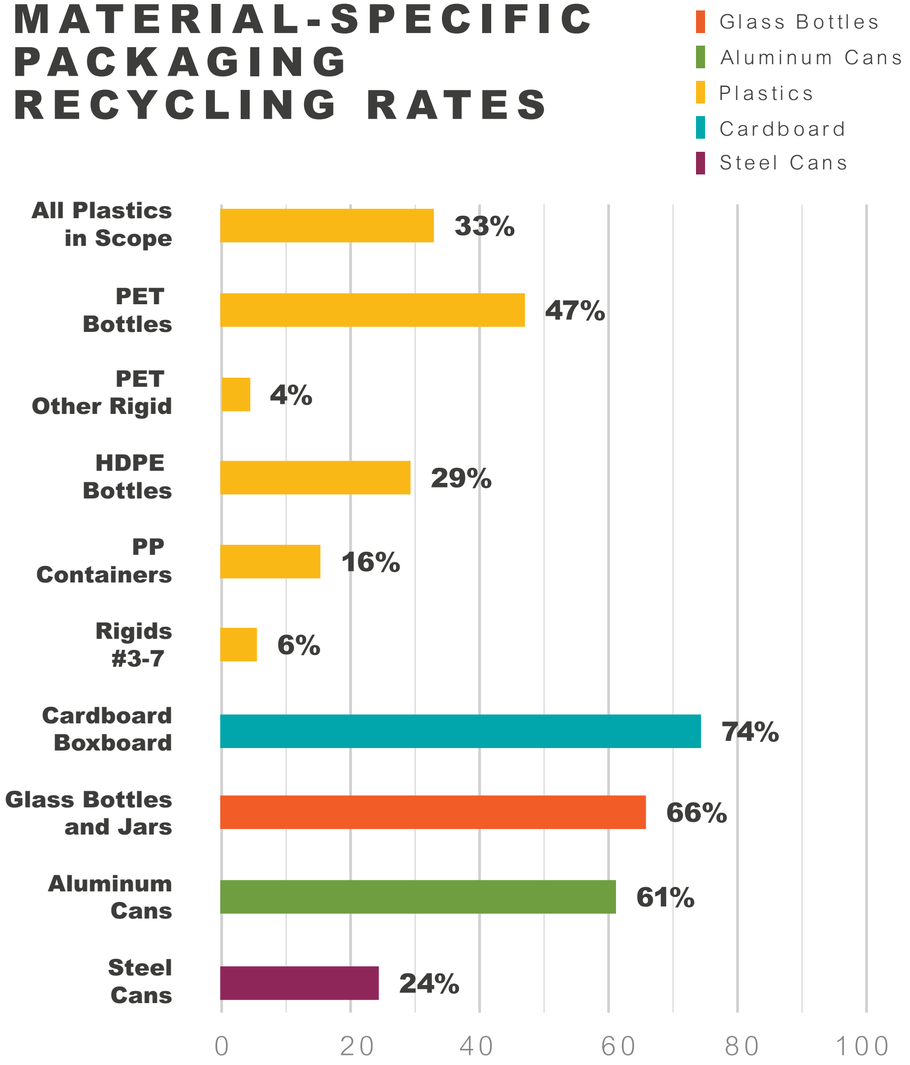
CONNECTICUT

OVERVIEW

Connecticut's Department of Energy and Environmental Protection (DEEP) provides information to residents on municipal recycling and coordinates waste management legislation. Through Connecticut General Statutes Section 22a-228(b), Connecticut has formally adopted an integrated waste management hierarchy as a guiding framework for solid waste management efforts.[38] In 2016, Connecticut adopted the Comprehensive Materials Management Strategy (CMMS), a roadmap to achieve a set, non-binding state goal of 60% diversion of materials from disposal by 2024.[39]

The DEEP administers statewide programs for beverage containers. Connecticut's Beverage Container Deposit and Redemption Law has attached a $0.05 deposit to beverage containers since 1980. The law currently applies to beer, malt, carbonated soft drinks and bottled water (the last of which was added in 2009). [40]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



CONNECTICUT

DATA

The most recent statewide reports published were in a 2017 report, relating to 2014 data.[41] A waste characterization was conducted and published by the DEEP in 2015. [42]

KEY TAKEAWAYS

Recycling

- Connecticut's CCPM recycling rate is ~63% which is the third highest in the country.
- Without the contribution of cardboard and boxboard the recycling rate for the other materials is ~52%. This is the fifth highest in the country.
- In Connecticut, ~47% of PET bottles and ~66% of glass bottles and jars are recycled, which is above average for northeastern states. ~29% of HDPE bottles are recycled, which is below average for northeastern census region. With a rate of ~74%, Connecticut also ranks fifth for recycling of cardboard and boxboard. It has a relatively low recycling rate of ~49% for DRS materials but it does have 100% curbside access.

Generation and Disposal

- Connecticut generates ~382 lbs/capita/year of CCPM making it one of the highest per capita generation states. With a recycling rate of ~63% this leads to ~129lbs/capita/year disposed. The state disposes less CCPM per capita than 80% of other US states.

Data

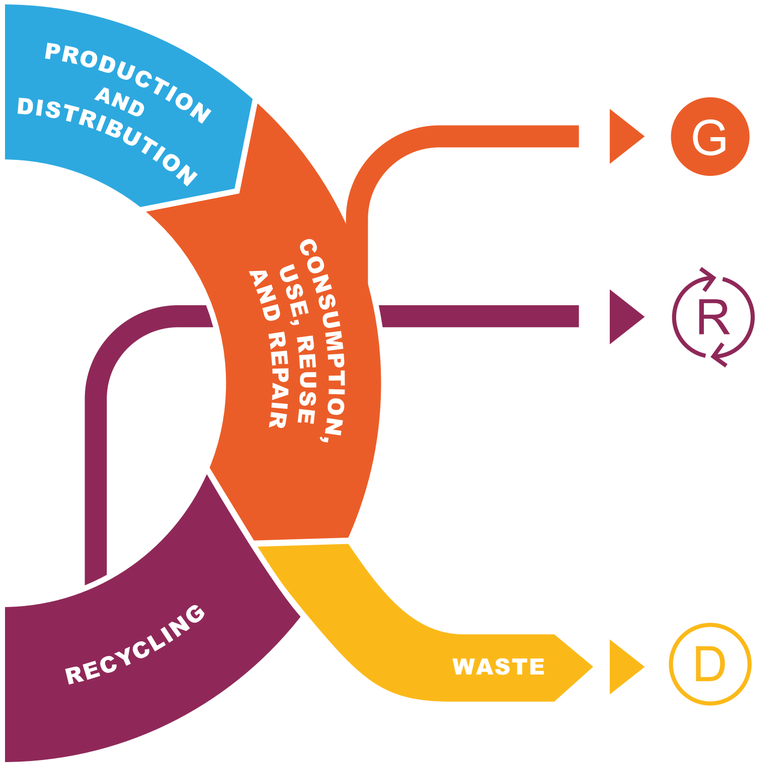
- State law and regulation require solid waste and recycling data to be submitted to the Connecticut DEEP by municipalities and by permitted solid waste facilities. Access to data both on recycling and disposal enables better planning and is likely to have contributed to Connecticut being one of the best performing states for CCPM.

DELAWARE

KEY FACTS

POPULATION	**973,764**
PERCENT URBAN	**83.3%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**3**
PERFORMANCE	
CCPM RECYCLING RATE	**59%**
CCPM GENERATION RANK	**50**
CCPM RECYCLING RANK	**9**
CCPM RECYCLING RANK without Cardboard	**14**
CCPM DISPOSAL RANK	**12**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.19 million tons
397 lbs. per capita

PACKAGING RECYCLED
0.11 million tons
238 lbs. per capita

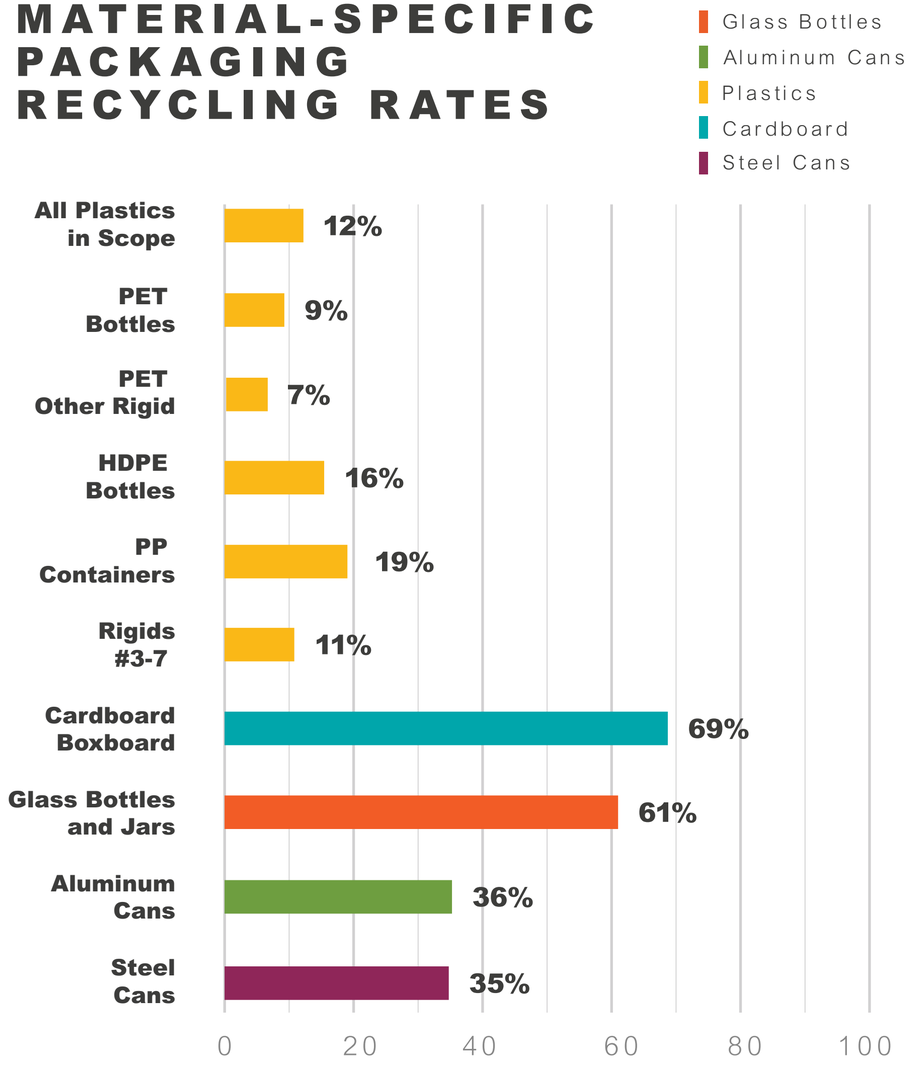
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.08 million tons
159 lbs. per capita

DELAWARE

OVERVIEW

The Department of Natural Resources and Environmental Control (DNREC) works with local governments in Delaware to manage solid waste and encourage recycling, though operational responsibility lies with local government. The Recycling Public Advisory Council (RPAC) and DNREC have developed guidelines for the recycling industry to report information as directed by the Universal Recycling Law (7 Del. C., §6056).[43] This legally required reporting system aims to generate a fuller and more accurate spectrum of data. The state has a target diversion rate (of recyclables) of 60% in 2020. [44]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



DELAWARE

DATA

Recyclables tonnage data for 2018 is available in a government reported titled “Statewide Solid Waste Management Plan for Delaware: Moving Toward Zero Waste” [45] (State of Delaware). The Delaware Solid Waste Authority (DSWA) publishes reports detailing the amount of MSW that is both landfilled and diverted from landfill in Delaware on an annual basis. In 2017, DSWA published a statewide waste characterization study for calendar year 2016,[46] which provides aggregated disposal composition data by material and generator type.

KEY TAKEAWAYS

Recycling

- Delaware’s CCPM recycling rate is ~59% which is the 9th highest in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~43%. This is 14th highest in the country.
- ~9% of PET bottles and ~16% of HDPE bottles are recycled in Delaware, which is below average for northeastern states. ~69% of glass bottles and jars and ~69% of cardboard and boxboard are recycled, which is above average for the region.

Generation and Disposal

- Delaware generates ~397 lbs/capita/year of CCPM making it the state with the highest per capita generation. With a recycling rate of ~59% this leads to ~159lbs/capita/year disposed. On a per capita basis, Delaware disposes less CCPM than 60% of other US states. The state’s average landfill tip fee is above average for other states in the northeast region.

Data

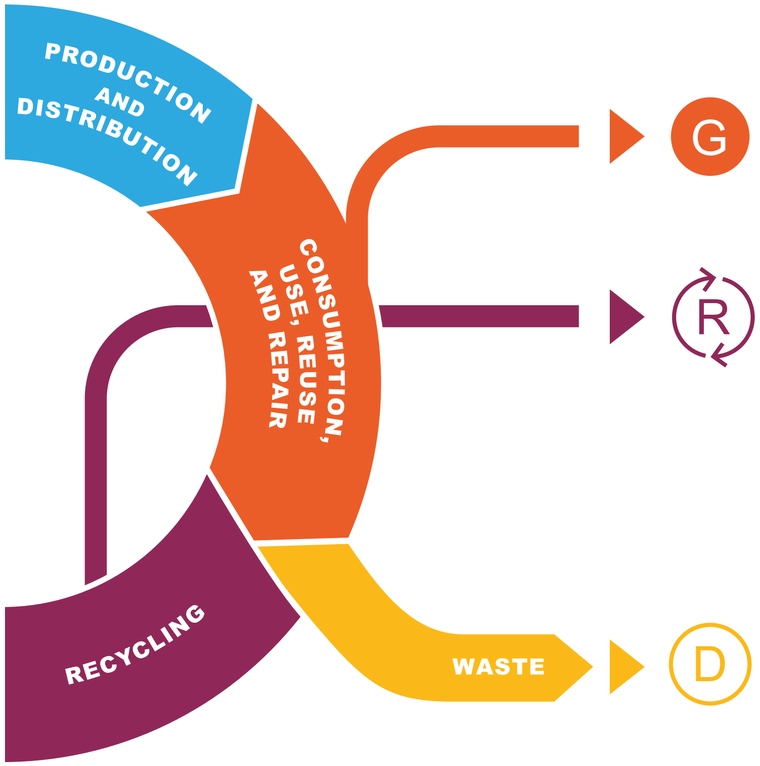
- Delaware has statewide waste and recycling data, but it is not comprehensive. A South Atlantic state with comprehensive statewide data is Florida, which might serve as a model for Delaware.

FLORIDA

KEY FACTS

POPULATION	**21,477,737**
PERCENT URBAN	**91.2%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**42%**
CCPM GENERATION RANK	**47**
CCPM RECYCLING RANK	**21**
CCPM RECYCLING RANK without Cardboard	**27**
CCPM DISPOSAL RANK	**32**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
4.12 million tons
388 lbs. per capita

PACKAGING RECYCLED
1.84 million tons
173 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
2.28 million tons
215 lbs. per capita

FLORIDA

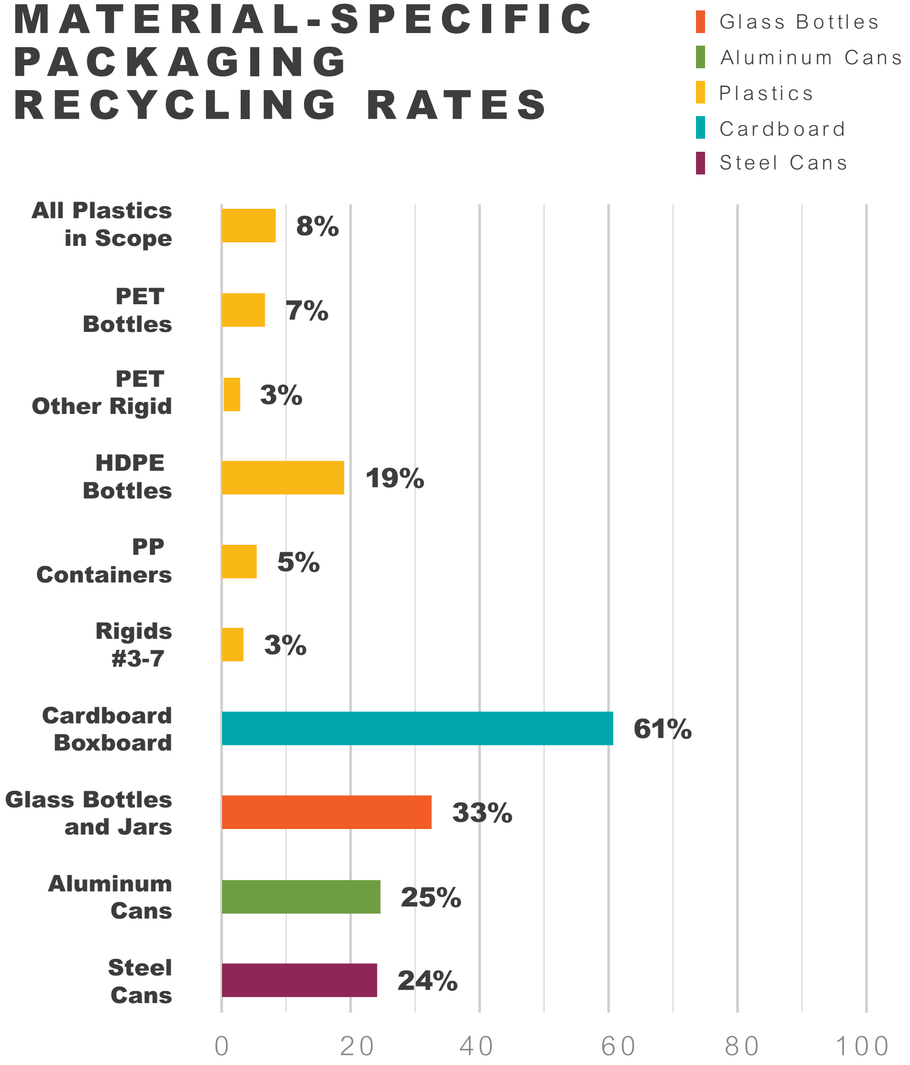
OVERVIEW

The Florida Department of Environmental Protection (DEP) is the state's lead agency for environmental management and stewardship. Each county in Florida is required to implement a recycling program for solid waste. Recycling programs must be designed to recover and recycle a significant portion of at least four of the following materials: newspaper, aluminum cans, steel cans, glass, plastic bottles, cardboard, office paper and yard trash. [47]

The recently launched Wrap Recycling Action Program (WRAP) is designed to boost plastic bag and film recycling, increase demand for recycled plastics and provide education on how film recycling can benefit Florida's communities. [48]

Florida had an ambitious weight-based recycling target of 75% by 2020,[49] which was not achieved.. This is largely due to low participation rates in recycling programs, despite curbside recycling programs being available to 92% and 68% of single-family and multi-family households respectively, according to Florida DEP data. [50] Florida's recycling rate is still above the national average.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



FLORIDA

DATA

The DEP produces regular publications, including annual solid waste management reports that detail tonnages of materials collected and recycled by county, participation rates by generator type, tons of waste disposed by disposal route, and so forth. State law requires all public entities to report recycled materials on an annual basis.[51] The most recent report is for calendar year 2019.[52]

The department has also published a waste characterization study for three separate areas within the state (2019),[53] which provide estimates of the composition of disposed waste across the state.

KEY TAKEAWAYS

Recycling

- Florida's CCPM recycling rate is ~42% which is the 21st highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans comes to ~21%, which is among the highest for states in the south.

Generation and Disposal

- Florida generates ~388 lbs/capita/year of CCPM. This is within the top 10 highest generators in the nation.
- Florida disposes of ~215lbs/capita/year of these materials, which is within the highest 40% nationwide.
- The state's average landfill fee is the highest of those in the southern region.

Data

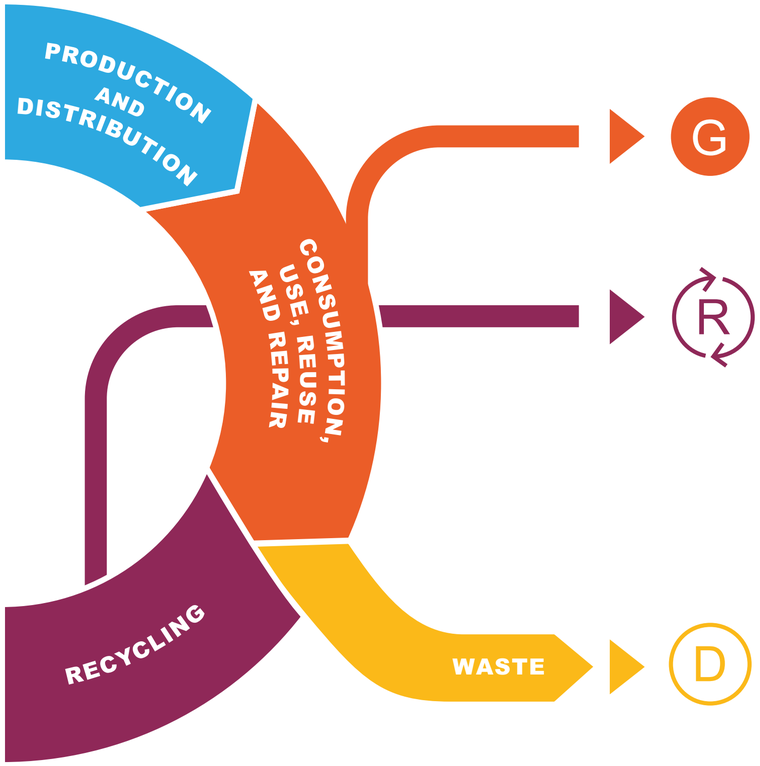
- Florida has a comprehensive data system but could consider undertaking a statewide MSW waste characterization to better understand waste composition in the state.

GEORGIA

KEY FACTS

POPULATION	**10,617,423**
PERCENT URBAN	**75,1%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**36%**
CCPM GENERATION RANK	**36**
CCPM RECYCLING RANK	**29**
CCPM RECYCLING RANK without Cardboard	**32**
CCPM DISPOSAL RANK	**34**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.91 million tons
363 lbs. per capita

PACKAGING RECYCLED
0.74 million tons
141 lbs. per capita

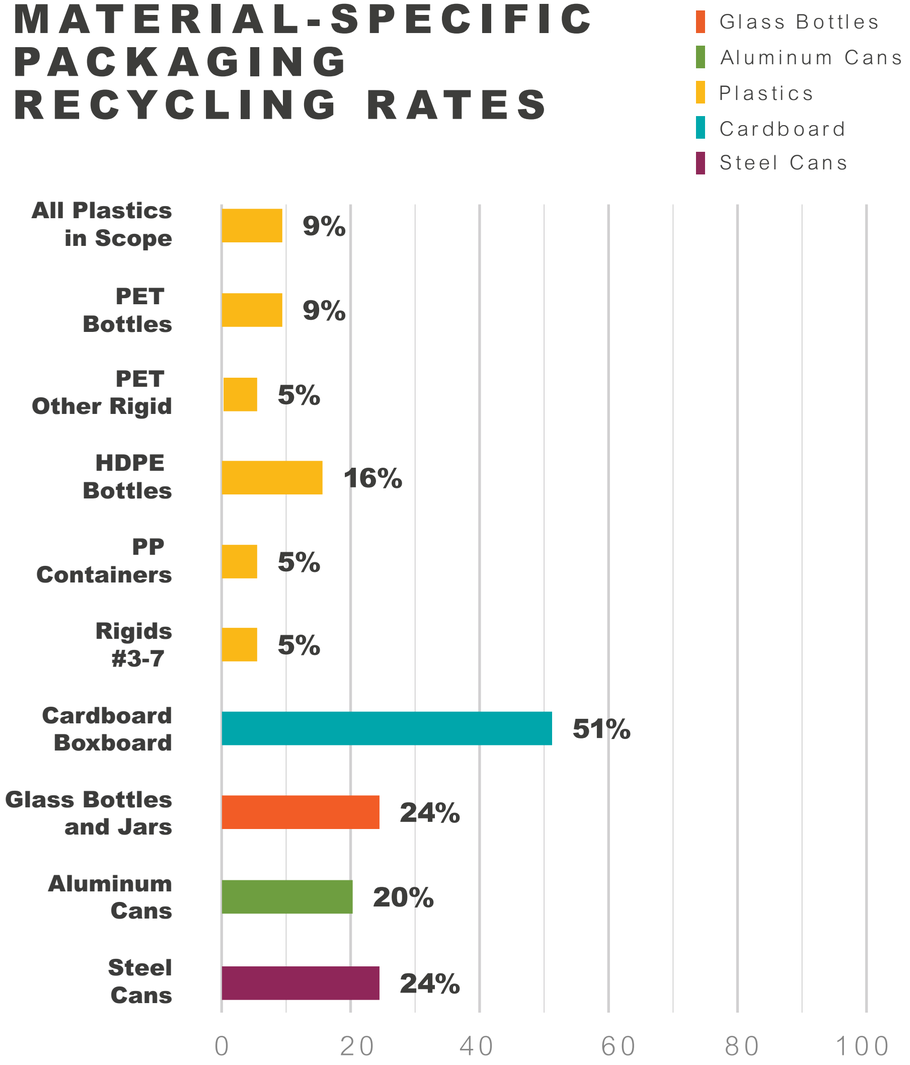
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
1.17 million tons
222 lbs. per capita

GEORGIA

OVERVIEW

The Land Protection Branch of the Georgia Environmental Protection Division (EPD) manages the disposal and treatment of solid waste through the permitting of municipal and industrial solid waste landfills. [54] Its Recovered Materials Unit (RMU) encourages and provides technical assistance on reduction, recycling, and reuse of materials. The state currently has no overarching legislation regarding the management of post-consumer packaging.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



GEORGIA

DATA

There is no tonnage data or statewide composition studies available for recyclables in Georgia, though the City of Atlanta reports total tons of materials recycled on an annual basis. The most recent study on statewide waste composition is from 2005.[55] Georgia EPD records data on MSW tonnages disposed on a quarterly basis, and publishes annual reports, with the most recent publication covering tonnages in calendar year 2018.[56] There is currently no requirement for owners/operators of disposal facilities to report disposed tonnages by material type.

KEY TAKEAWAYS

Recycling

- Georgia's CCPM recycling rate is ~36%, which is around the median for the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~17%, highlighting the influence of the high proportion and recycling rate of cardboard and boxboard.

Generation and Disposal

- Georgia generates ~363 lbs/capita/year of CCPM. This is higher than the national average and second only to Florida in the southern region.
- Georgians dispose of ~222lbs/capita/year, sending more material (on average) to landfill and incineration than the rest of the country.
- The average landfill fee for Georgia is around average for the south.

Data

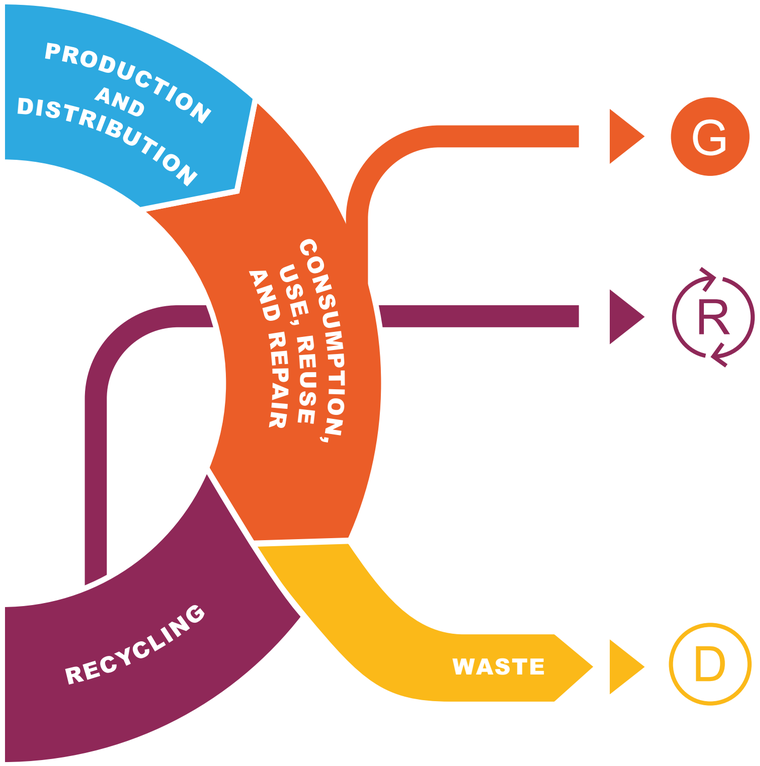
- Georgia should consider undertaking a waste characterization study to better understand waste composition in the state. It should also consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities.

HAWAII

KEY FACTS

POPULATION	**1,787,065**
PERCENT URBAN	**71%**
CENSUS SUB-REGION	**Pacific**
EPA REGION	**9**
PERFORMANCE	
CCPM RECYCLING RATE	**45%**
CCPM GENERATION RANK	**48**
CCPM RECYCLING RANK	**17**
CCPM RECYCLING RANK without Cardboard	**17**
CCPM DISPOSAL RANK	**23**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.28 million tons
394 lbs. per capita

PACKAGING RECYCLED
0.14 million tons
191 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.14 million tons
203 lbs. per capita

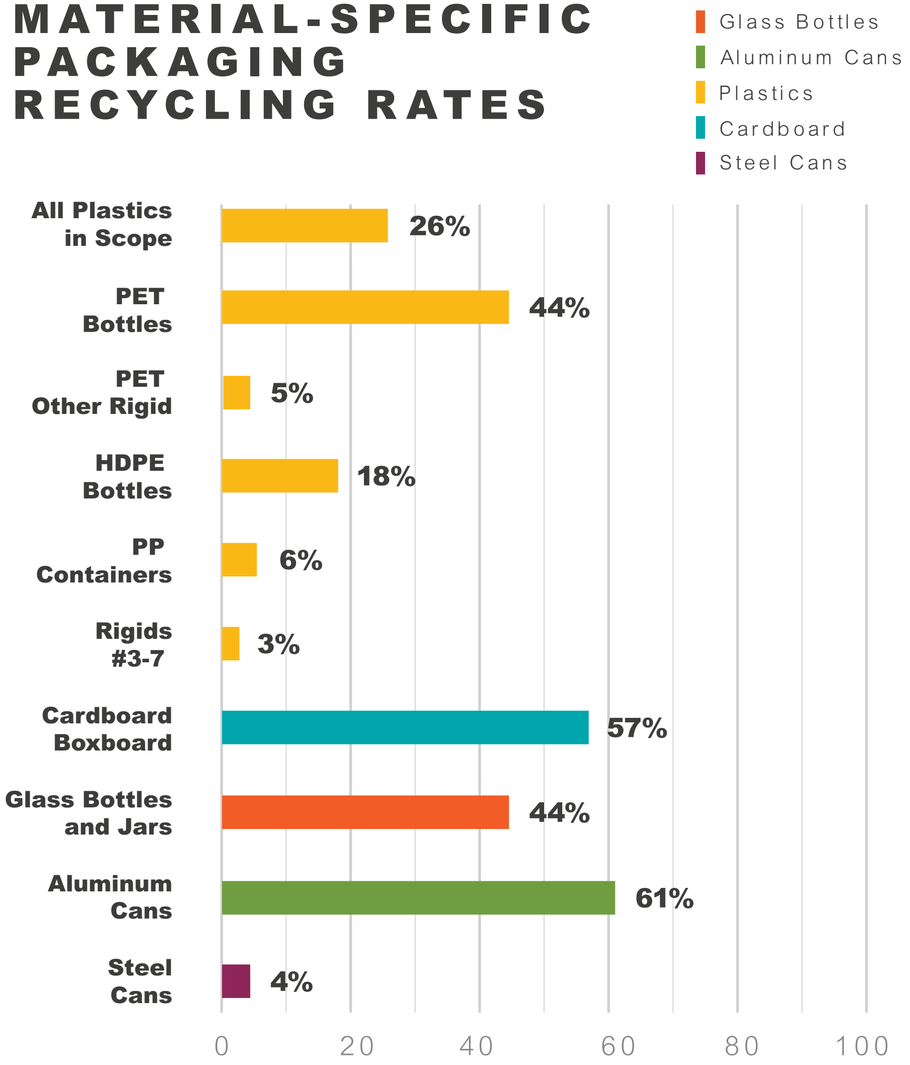
HAWAII

OVERVIEW

The Hawaii Department of Health (DOH) oversees the state's waste management programs. Every county in Hawaii operates under the umbrella of the health department and is required to have an integrated solid waste management plan, which the health department must approve.[57] The DOH is expected to submit an annual report on the state's progress towards its waste reduction goals. However, the last report was published in March 2020, and previously not since 2015.[58]

Hawaii has had a bottle bill in place since 2005 and uses redemption centers as return points. In FY 2019, Hawaii reported an overall redemption rate of 62%. [59]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



HAWAII

DATA

Hawaii has conducted several regional waste characterization studies and reports tons managed for both the disposal and recycling streams. However, prior to the 2020 report, statewide information aside from bottle bill tonnages was not available. Different islands have their own reporting systems, and the characterization studies they have each undergone do not contain the same material categories. Because nearly 60% of the state's population resides on Oahu, the studies conducted on that island's waste stream are a good baseline to model the state.

KEY TAKEAWAYS

Recycling

- Hawaii's CCPM recycling rate is ~45% which ranks 17th in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~37%, which is the 17th highest in the US, indicating that the impact of cardboard and boxboard is lower than in some other states.
- ~95% of the recycled rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are collected via the state's DRS, the highest proportion of any bottle bill state.
- Recycling rates for materials included in Hawaii's DRS is strong: ~44% for PET bottles, ~45% for glass bottles and jars, and ~61% for aluminum cans.

Generation and Disposal

- Hawaii generates ~394 lbs./capita/year of CCPM, which is among the 10 states with the highest generation.
- Hawaii disposed of ~203 lbs./capita/year, which is near the median nationwide.
- The average landfill fee for Hawaii is the 2nd highest in the country and for the western states.

Data

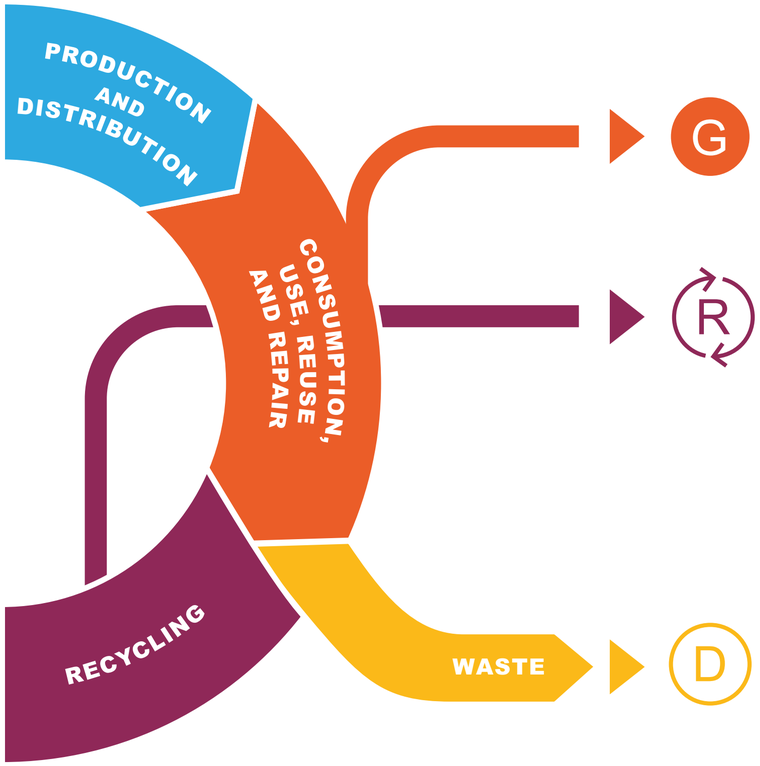
- Hawaii should consider carrying out a standardized statewide waste characterization study to better understand waste composition in the state. The state should also consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities.

IDAHO

KEY FACTS

POPULATION	**1,787,065**
PERCENT URBAN	**71%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**10**
PERFORMANCE	
CCPM RECYCLING RATE	**36%**
CCPM GENERATION RANK	**20**
CCPM RECYCLING RANK	**30**
CCPM RECYCLING RANK without Cardboard	**34**
CCPM DISPOSAL RANK	**27**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.30 million tons
340 lbs. per capita

PACKAGING RECYCLED
0.12 million tons
132 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.18 million tons
208 lbs. per capita

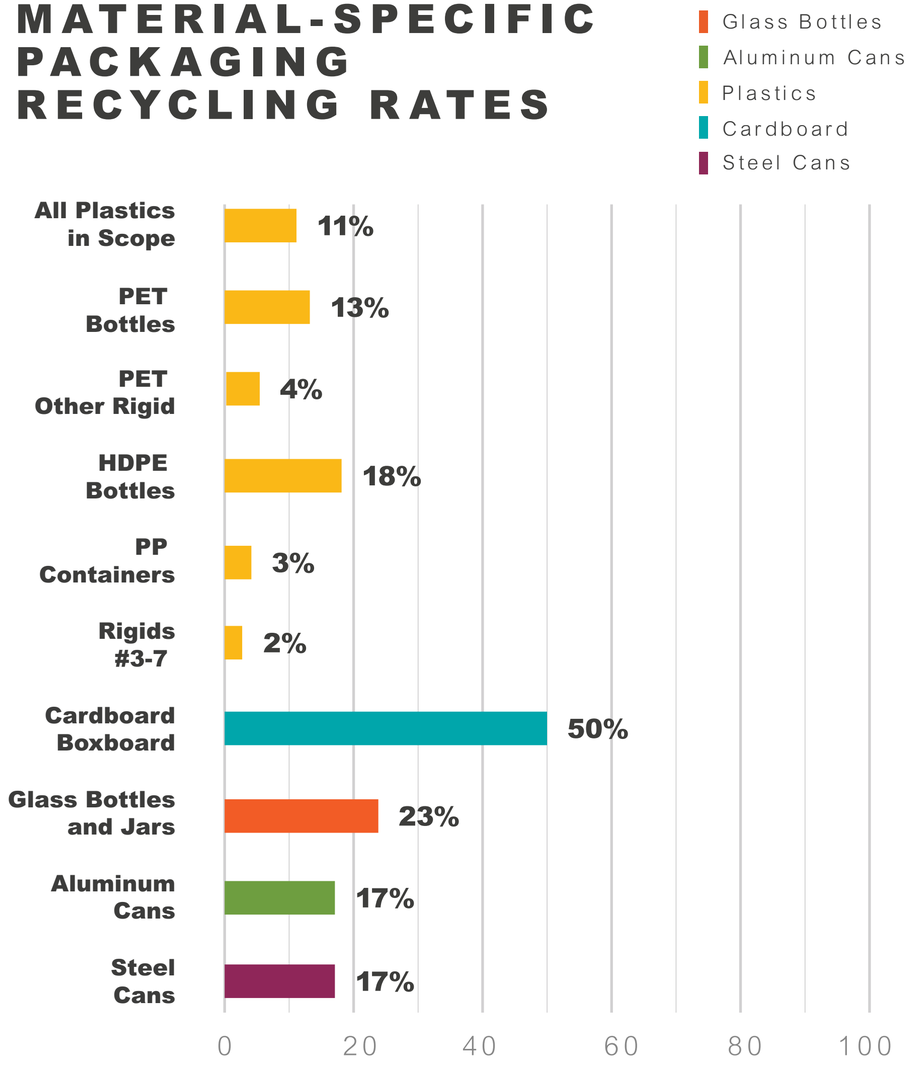
IDAHO

OVERVIEW

The Idaho Department of Environmental Quality (DEQ) is the designated agency responsible for regulating most solid waste management facilities in Idaho, including landfills, incinerators, and transfer stations, but not recycling centers. The state has no mandated waste diversion goal. Both recycling and garbage collection are optional services provided at the discretion of local governments or by private recycling companies. [60]

Compared to other states, recycling in Idaho is largely limited.[61] The primary reason for this is the relatively low cost of disposal, which is related to the fact that Idaho has one of the lowest population densities of all US states and therefore ample landfill space.[62]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



IDAHO

DATA

Overall, data relating to garbage or recycling in Idaho is extremely limited. The state does not require facilities to track their recycling rates and does not request voluntary submission of waste tonnages or composition. [63]

KEY TAKEAWAYS

Recycling

- Idaho's CCPM recycling rate is ~36% which puts it near the median for state-wide recycling rate across the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~17%, indicating the impact of cardboard and boxboard.
- Idaho's CCPM recycling rates, with and without cardboard and boxboard included, are both below average for the western states.

Generation and Disposal

- Idaho generates ~340 lbs./capita/year of CCPM, which is within the lowest 40% in the US.
- Idaho's average recycling rate leads to a disposal rate of ~208 lbs./capita/year, which is also around the country's median rate.
- The state's average landfill fee is below average for the western region and is unlikely to incentivize increased waste diversion.

Data

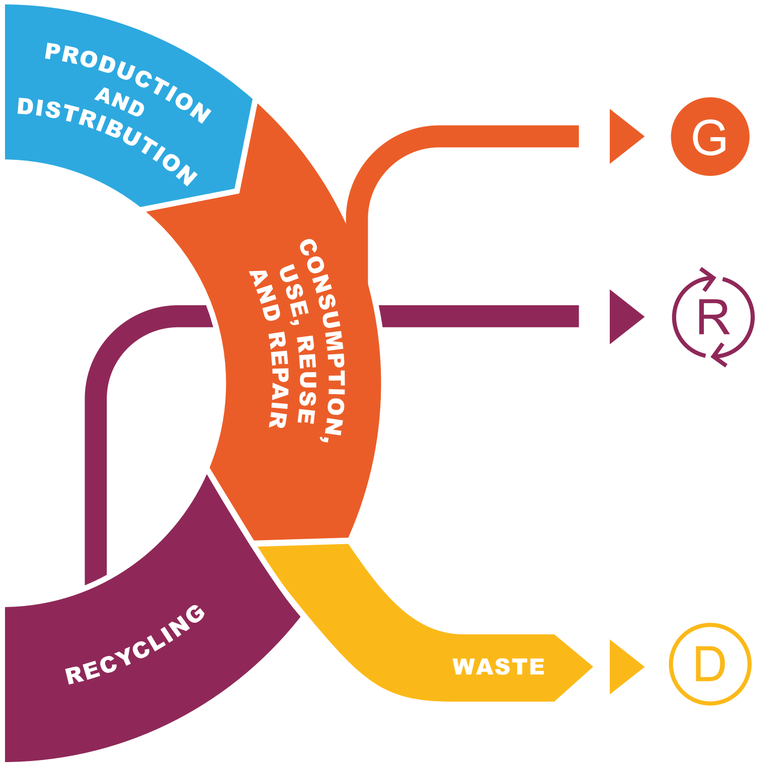
- Idaho's data is very limited. The state should consider undertaking a waste characterization study to better understand waste composition in the state. It should also consider setting up a data reporting system for municipalities and waste and recycling facilities.

ILLINOIS

KEY FACTS

POPULATION	**12,671,821**
PERCENT URBAN	**88.5%**
CENSUS SUB-REGION	**North East Central**
EPA REGION	**5**
PERFORMANCE	
CCPM RECYCLING RATE	**33%**
CCPM GENERATION RANK	**44**
CCPM RECYCLING RANK	**38**
CCPM RECYCLING RANK without Cardboard	**28**
CCPM DISPOSAL RANK	**46**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
2.42 million tons
380 lbs. per capita

PACKAGING RECYCLED
0.80 million tons
126 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
1.61 million tons
254 lbs. per capita

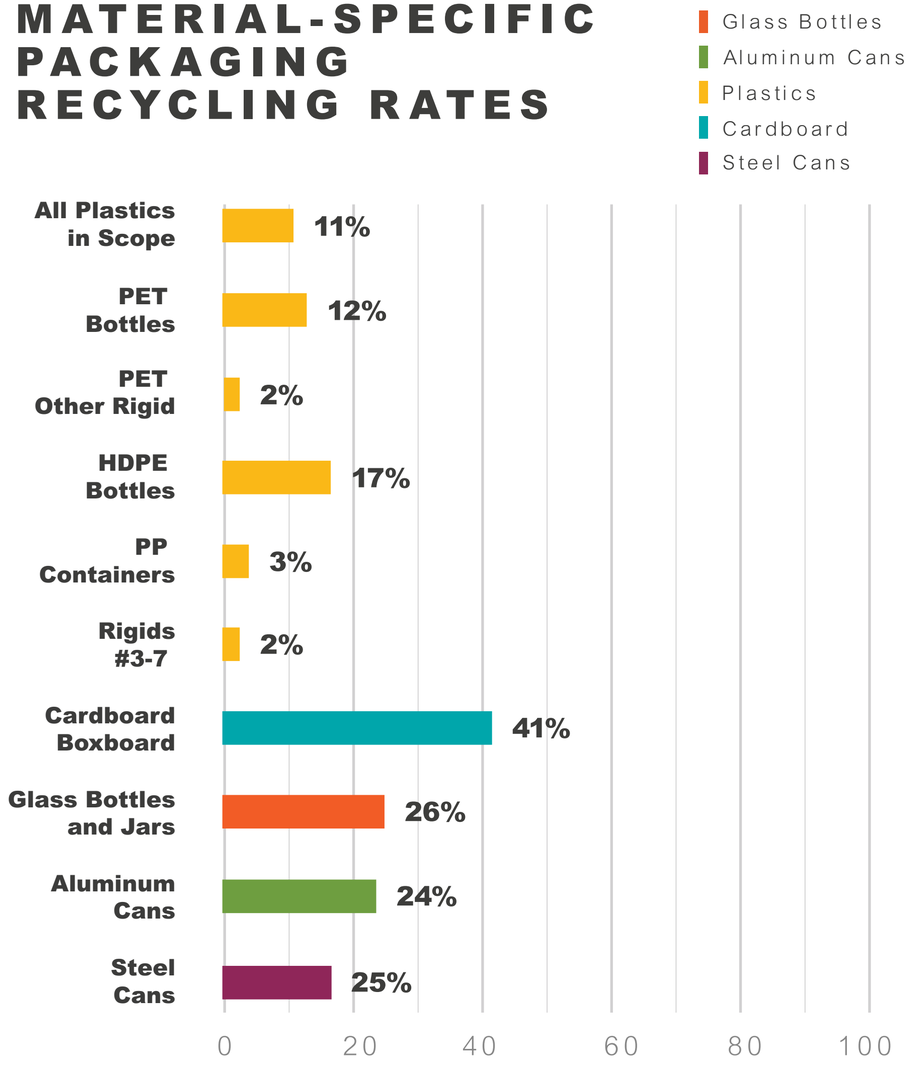
ILLINOIS

OVERVIEW

The Illinois Environmental Protection Agency (IEPA) is the primary body concerned with waste management in Illinois. IEPA is responsible for overseeing compliance with state and federal environmental laws and regulations, through a system of permits, inspections, and enforcement activities.[64]

Illinois runs a unique risk of running out of landfill space, therefore in-state waste management solutions are likely to become increasingly important in the near future.[65] A Bill regarding a container deposit scheme (HB2651) is currently sitting with the Energy and Environment Committee.[66]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



ILLINOIS

DATA

There is no mandatory data reporting in Illinois, which makes it difficult to obtain accurate information on recycling and disposal tonnages and/or composition. The most recent waste characterization [67] study was commissioned by the Illinois Department of Commerce and Economic Opportunity in 2015; this report also provides an estimate for disposed tons by material category and generator type (e.g., residential, and commercial). IEPA publishes an annual landfill capacity report that indicates volume of landfill capacity remaining in cubic yards. [68]

KEY TAKEAWAYS

Recycling

- Illinois' CCPM recycling rate is ~33%, which is among the twenty lowest performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~20%. This is the twenty-eighth highest rate in the US.

Generation and Disposal

- Illinois generates ~380 lbs./capita/year of CCPM, placing it among the top 20% highest states for per capita generation.
- With its recycling rate of ~33%, this leads to ~254 lbs./capita/year of material disposed. As a result, Illinois is one of the top five US states that dispose the most material per capita.

Data

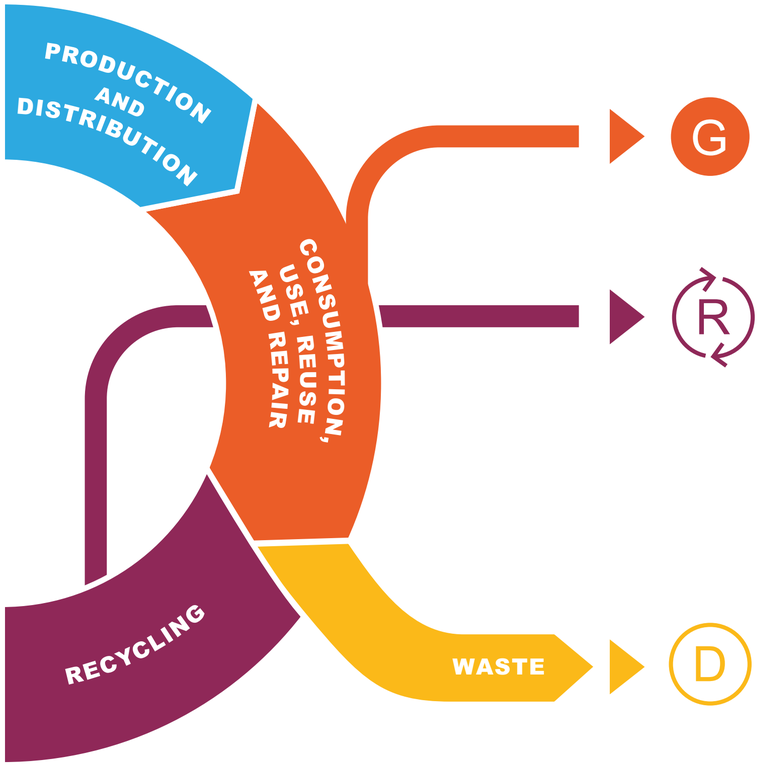
- Illinois should consider carrying out a waste characterization study to gain a better understanding of current waste composition in the state. The state should also consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities.

INDIANA

KEY FACTS

POPULATION	**6,695,497**
PERCENT URBAN	**72%**
CENSUS SUB-REGION	**East North Central**
EPA REGION	**5**
PERFORMANCE	
CCPM RECYCLING RATE	**34%**
CCPM GENERATION RANK	**32**
CCPM RECYCLING RANK	**33**
CCPM RECYCLING RANK without Cardboard	**24**
CCPM DISPOSAL RANK	**40**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.20 million tons
357 lbs. per capita

PACKAGING RECYCLED
0.41 million tons
125 lbs. per capita

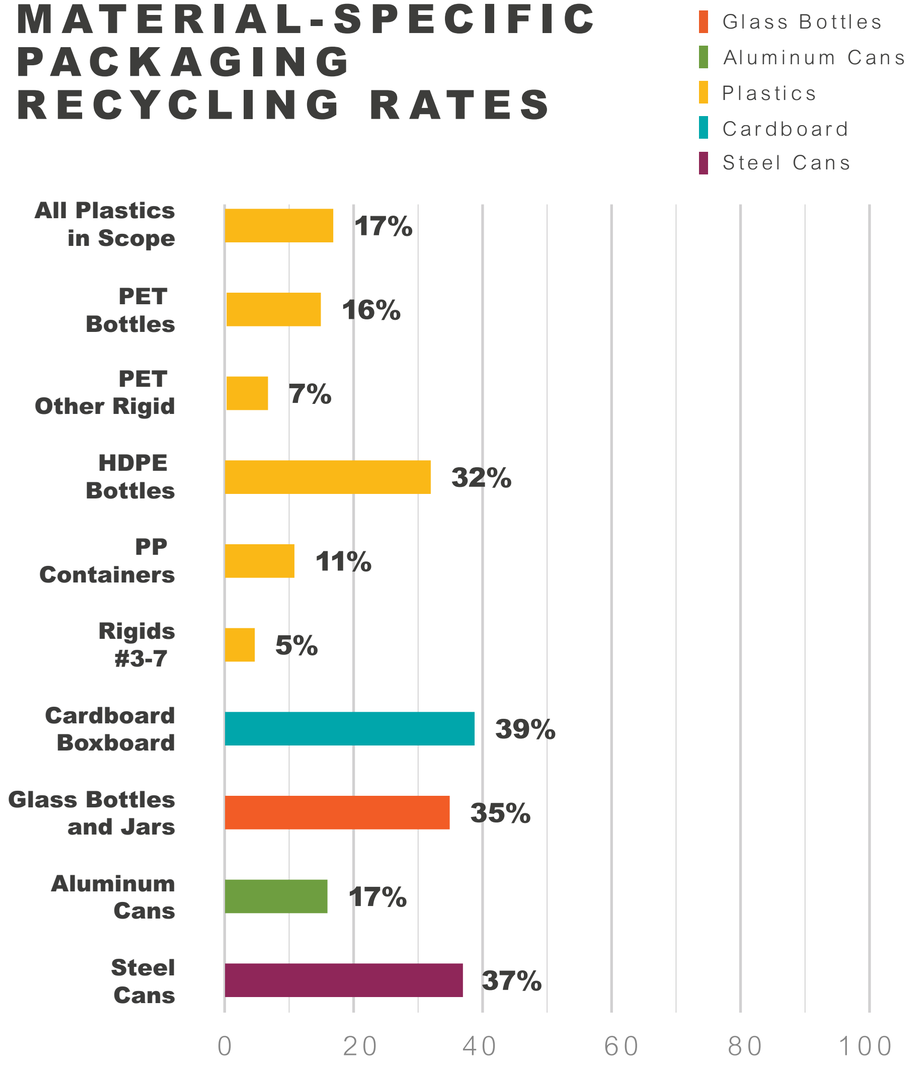
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.78 million tons
233 lbs. per capita

INDIANA

OVERVIEW

Recycle Indiana is a branch of the Indiana Department of Environmental Management (IDEM) that works with partners across the state to promote and provide technical assistance about recycling. IDEM also administers a Recycling Market Development Program that provides grants to develop recycling markets across the state.[69] In 2014, the state passed recycling legislation (HB 1182) that required annual reporting of recycling rates and set a goal to reach and sustain a recycling rate of 50%. [70]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



INDIANA

DATA

Facilities involved in waste disposal (defined in the state to include composting facilities, landfills, processing facilities, transfer stations, waste tire facilities and waste-to-energy plants) [71] are required to submit reports to IDEM on the amounts and types of MSW and recyclables they process from Indiana's waste stream on an annual basis. IDEM then publishes a yearly recycling activity report, which tracks progress against the 50% recycling rate goal and provides data on the type and number of recyclables.[72]

KEY TAKEAWAYS

Recycling

- Indiana's CCPM recycling rate is ~34%, which is the 33rd highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~27%. This is the 24th highest rate in the US.

Generation and Disposal

- Indiana generates ~357 lbs./capita/year of CCPM, placing it among the top 20 states with the highest per capita generation.
- With its recycling rate of ~34%, this leads to ~232 lbs./capita/year of material disposed. This puts Indiana among the top 20 states that dispose the most material per capita nationwide.

Data

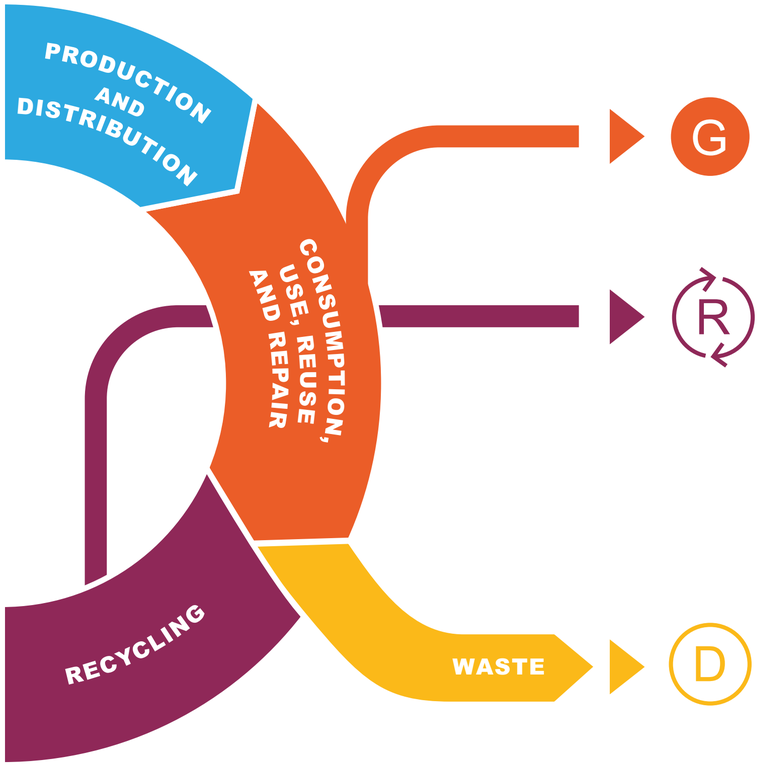
- Indiana has a comprehensive data system but could still consider undertaking a statewide MSW waste characterization study to better understand current waste composition in the state.

IOWA

KEY FACTS

POPULATION	**3,148,618**
PERCENT URBAN	**64%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**7**
PERFORMANCE	
CCPM RECYCLING RATE	**62%**
CCPM GENERATION RANK	**34**
CCPM RECYCLING RANK	**5**
CCPM RECYCLING RANK without Cardboard	**10**
CCPM DISPOSAL RANK	**8**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.57 million tons
363 lbs. per capita

PACKAGING RECYCLED
0.37 million tons
233 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.20 million tons
130 lbs. per capita

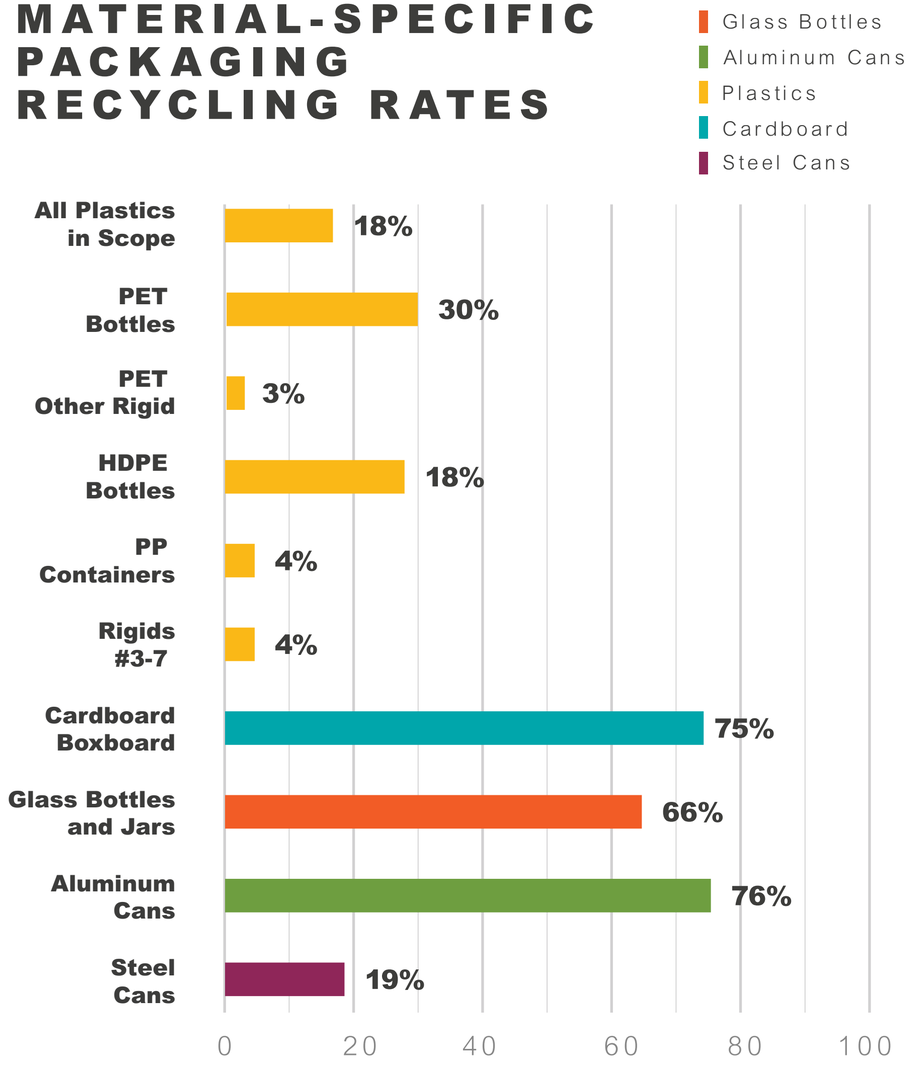
IOWA

OVERVIEW

Iowa does not keep track of annual tons recycled and does not have many laws regarding packaging recycling. One exception is Iowa's bottle bill (IAC Chapter 567-107), which was enacted in 1978 and requires a small (5-cents) refundable deposit to be placed on certain beverage containers. [73]

Iowa cities and counties are responsible for developing comprehensive solid waste reduction programs in collaboration with their landfills or other waste facilities. No statewide targets guide these comprehensive plans. [74]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



IOWA

DATA

The Iowa Department of Natural Resources (DNR) reports on the number of tons landfilled across the state on a quarterly basis, and in 2017 it produced a comprehensive and granular waste characterization study. [75] With the exception of material recovered via its bottle bill program, Iowa does not keep track of statewide recycled tons, and the most recent report on recycling tonnage estimates is from 2005. [76]

KEY TAKEAWAYS

Recycling

- Iowa's CCPM recycling rate is ~62%, which is the 5th highest in the country and highest among the Midwest states.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~44%. This is the 10th highest rate in the US.
- ~78% of all rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are captured through the state's DRS. ~76% of aluminum cans are recycled, which is the 2nd highest recycling rate among the Midwest states and 5th highest in the nation.
- ~75% of cardboard and boxboard is recycled, which is the highest among the Midwest states and third highest in the nation.

Generation and Disposal

- Iowa generates ~363 lbs./capita/year of CCPM, placing it among the top 20 states in terms of per capita generation.
- With its recycling rate of ~62%, this leads to disposal rate of ~130 lbs./capita/year. This makes Iowa one of the top 10 best performing states in terms of per capita waste disposal.

Data

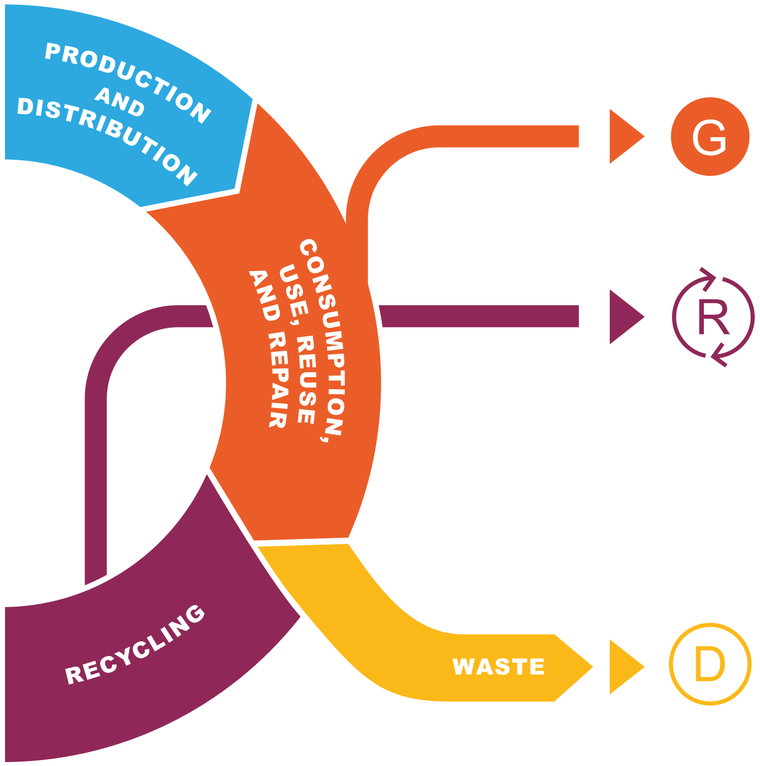
- Iowa should consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities. While the state has data on material-specific tonnages recycled through the bottle bill, it has little information available for other materials

KANSAS

KEY FACTS

POPULATION	**2,913,314**
PERCENT URBAN	**74%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**7**
PERFORMANCE	
CCPM RECYCLING RATE	**37%**
CCPM GENERATION RANK	**37**
CCPM RECYCLING RANK	**27**
CCPM RECYCLING RANK without Cardboard	**21**
CCPM DISPOSAL RANK	**36**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.53 million tons
363 lbs. per capita

PACKAGING RECYCLED
0.21 million tons
141 lbs. per capita

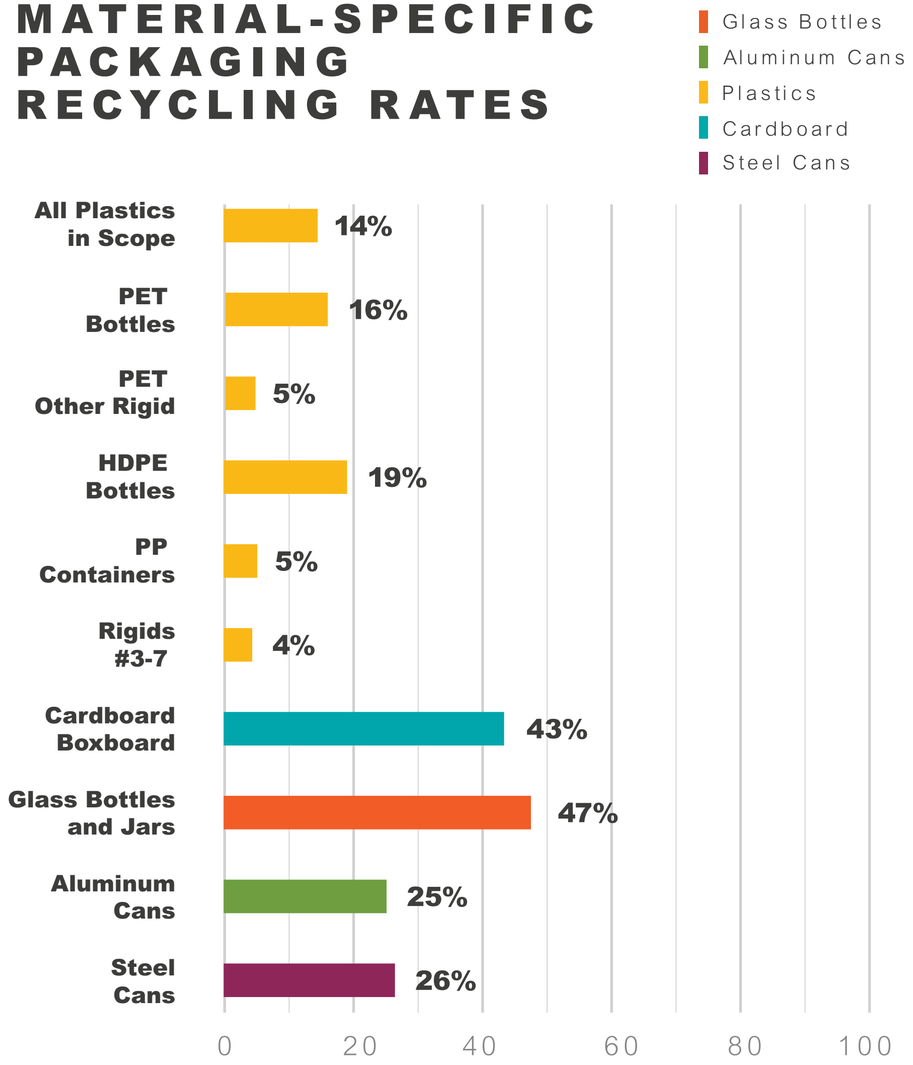
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.32 million tons
223 lbs. per capita

KANSAS

OVERVIEW

The Kansas Department of Health and Environment (KDHE) is the state agency responsible for Kansas' public health system, medical records, and environmental sustainability. Many individuals, private companies, and local governments contribute to the management of solid waste in Kansas including those involved in planning, consulting, collection, processing, monitoring, and disposal.[77] Recycling is not currently mandated in state law.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



KANSAS

DATA

KDHE does not regularly publish data on the weight or composition of materials recycled in Kansas and there are no statutory recycling reporting requirements. The state Solid Waste Management Plan is revised and published every 5 years – the most recent publication [78] (2016) contains a statewide percentage recycling rate, per capita disposal data and tonnages for solid waste landfilled by waste type (e.g., MSW). The most recent statewide MSW characterization study is from 2012.[79]

KEY TAKEAWAYS

Recycling

- Kansas's CCPM recycling rate is ~37%, which is the 27th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~32%. This is the 21st highest rate in the US.
- ~16% of PET bottles, ~19% of HDPE bottles, and ~25% of aluminum cans are recycled. All these recycling rates fall below the average for Midwest states.

Generation and Disposal

- Kansas generates ~363 lbs./capita/year of CCPM, making it one of the top 20 states with the highest per capita generation.
- With its recycling rate of ~37%, this leads to a disposal rate of ~223 lbs./capita/year. On a per capita basis, this puts Kansas among the top 20 states that dispose the least material nationwide.

Data

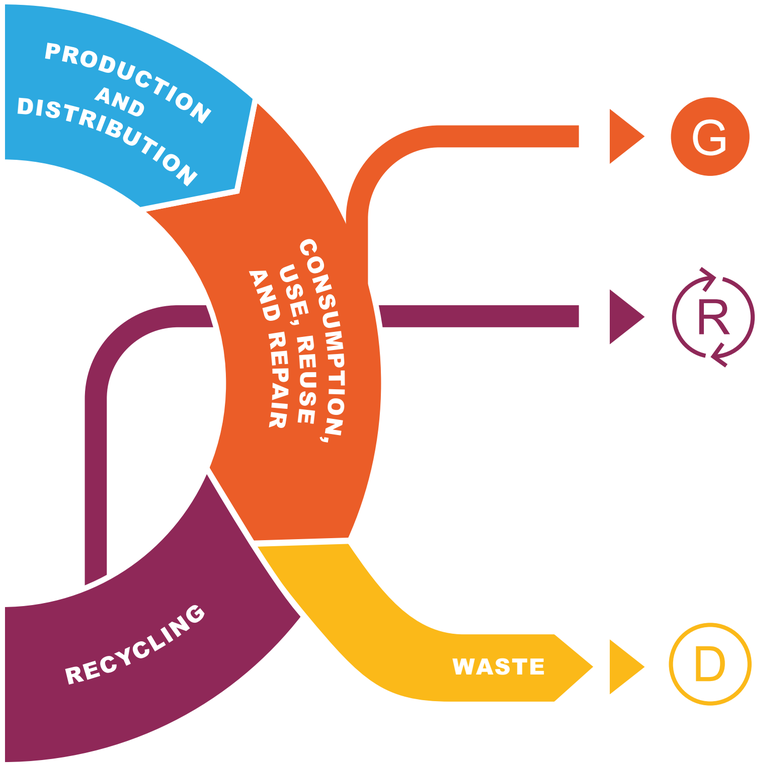
- Kansas should consider undertaking a waste characterization study to gain a better understanding of current waste composition in the state. It should also consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities.

KENTUCKY

KEY FACTS

POPULATION	**4,467,673**
PERCENT URBAN	**58%**
CENSUS SUB-REGION	**East South Central**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**24%**
CCPM GENERATION RANK	**25**
CCPM RECYCLING RANK	**46**
CCPM RECYCLING RANK without Cardboard	**39**
CCPM DISPOSAL RANK	**47**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.77 million tons
345 lbs. per capita

PACKAGING RECYCLED
0.20 million tons
90 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.57 million tons
255 lbs. per capita

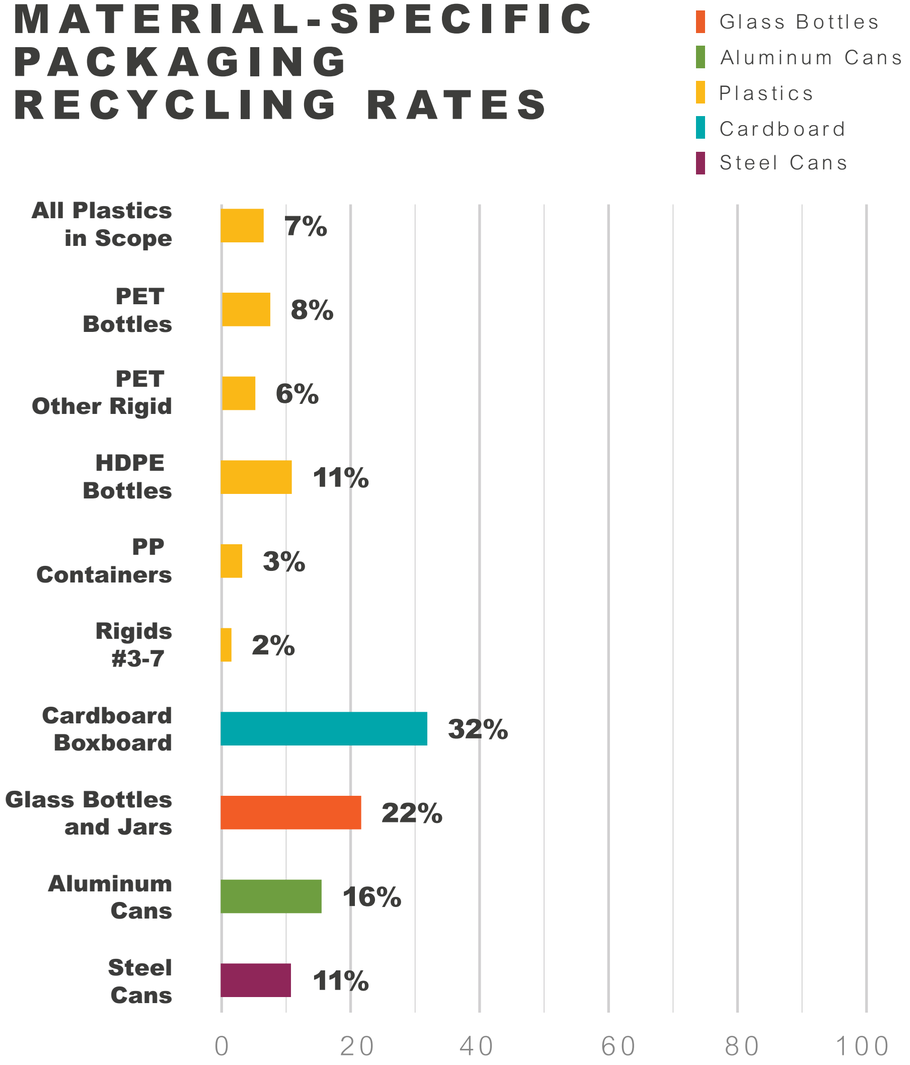
KENTUCKY

OVERVIEW

Kentucky has historically had strict laws regarding illegal dumping. Statute § 224.43-505 [80], for instance, requires waste haulers to register and report on tonnages in each county where they provide service. Following the passage of this law in 2002, the next landmark piece of statewide legislation was KRS 224.43-315, which requires recyclers to report their annual collected tons for recycling to the counties which they serve. [81]

In 2017, Kentucky reported a 38.2% recycling rate for all MSW materials, including scrap metals and electronics.[82] The overall recycling rate has remained flat over the past few years. Kentucky also keeps track of the annual tons of litter it removes from roadways, and the subsequent cost associated with cleanup.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



KENTUCKY

DATA

Kentucky reports annual total tons recycled and disposed in the state. However, the state has not conducted a waste characterization study or recycling sort. Characterizations are therefore based on studies done in the City of Louisville and extrapolated statewide based on per capita figures. [83]

KEY TAKEAWAYS

Recycling

- Kentucky's CCPM recycling rate is ~24%, which is among the top five worst performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~14%, which is around the average for states in the southern region.

Generation and Disposal

- Kentucky generates ~345 lbs./capita/year of CCPM, which is around the median for the nation.
- Kentucky disposes of ~255 lbs./capita/year of these materials, which places it among the top 10 states sending the most material to landfill.
- The state's average landfill fee is among the lowest in the nation and therefore does not incentivize waste diversion.

Data

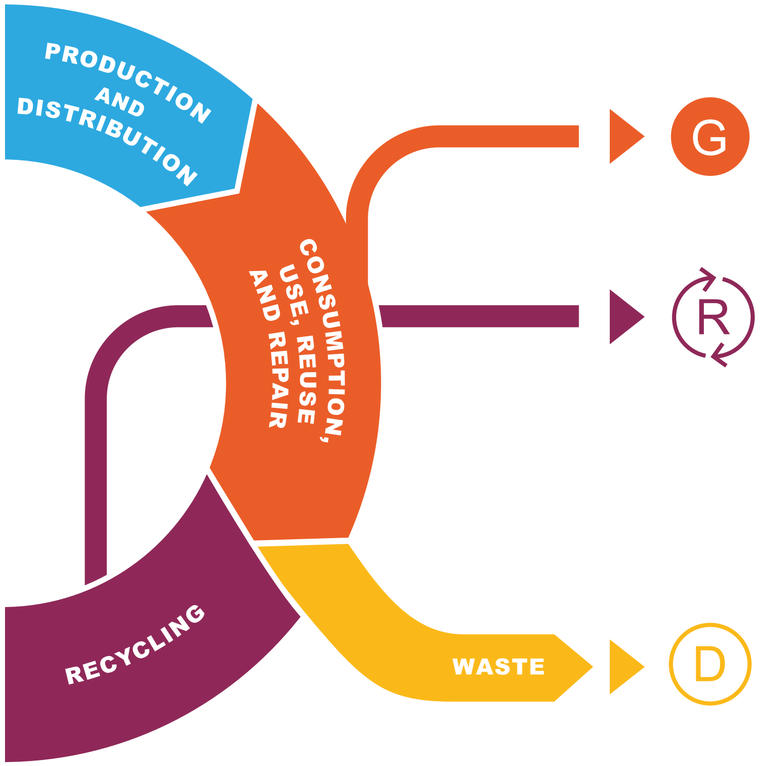
- Kentucky should consider carrying out a statewide waste characterization study to gain a better understanding of current waste composition in the state. The state should also consider expanding their data reporting system for municipalities and waste and recycling facilities to include a compositional breakdown.

LOUISIANA

KEY FACTS

POPULATION	**4,467,673**
PERCENT URBAN	**73.2%**
CENSUS SUB-REGION	**West Central South**
EPA REGION	**6**
PERFORMANCE	
CCPM RECYCLING RATE	**26%**
CCPM GENERATION RANK	**17**
CCPM RECYCLING RANK	**45**
CCPM RECYCLING RANK without Cardboard	**49**
CCPM DISPOSAL RANK	**43**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.78 million tons
336 lbs. per capita

PACKAGING RECYCLED
0.23 million tons
97 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.56 million tons
239 lbs. per capita

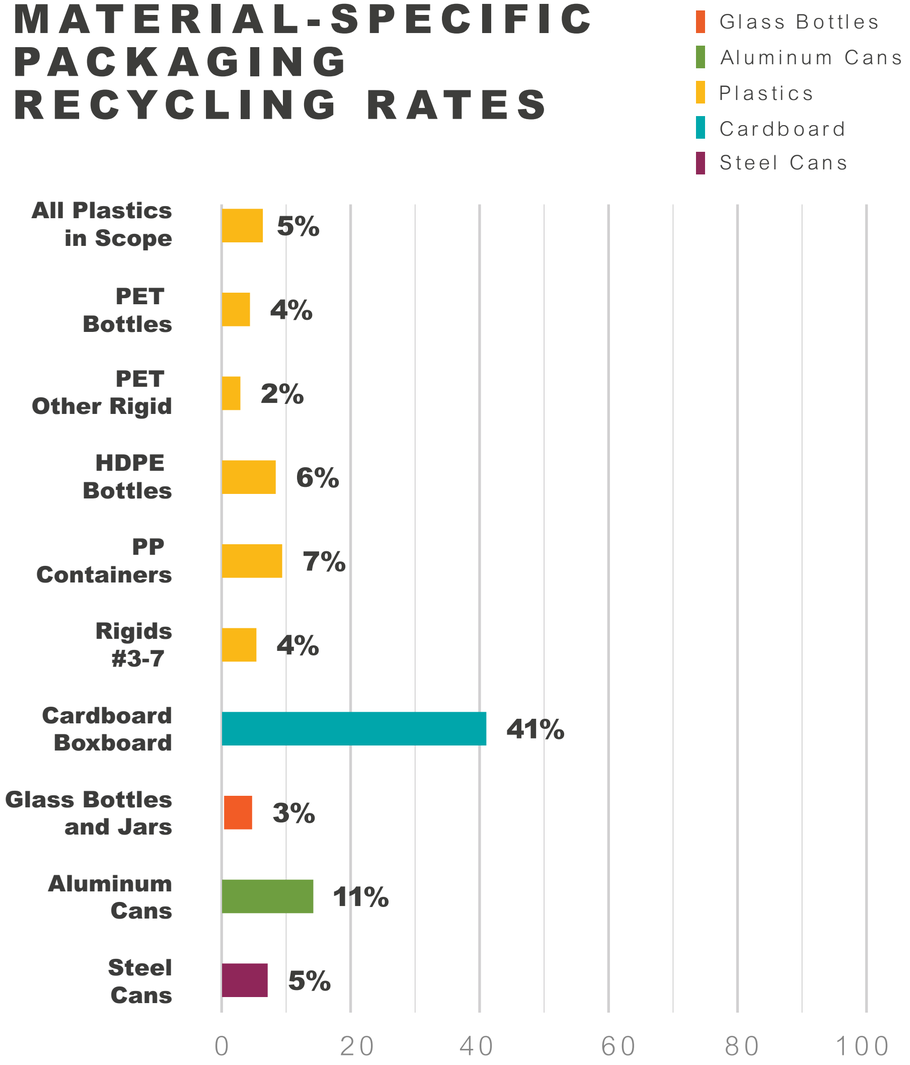
LOUISIANA

OVERVIEW

Louisiana State law L.R.S 30:2413 requires that the Department of Environmental Quality (DEQ) report annually to the state Senate regarding its progress and findings from the past year.[84] The DEQ requests voluntary reports from solid waste planners on their tons and activities. In 2018, Louisiana calculated its recycling rate as 12.9%. In 2018, the survey covered 47% of Louisiana's population.[85]

Louisiana has attempted to increasing recycling rates through economic incentive plans. Through its Corporate Recycling Tax Credits program, Louisiana offers a 14.4% tax credit to entities who purchase qualified new recycling equipment. [86]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



LOUISIANA

DATA

Louisiana has a voluntary reporting program wherein the Natural Resources and Environment Committee requests annual recycling data from state jurisdictions.[87] The most recent recycling reporting covers 47% of the state's population. The state does not produce a statewide waste characterization report.

KEY TAKEAWAYS

Recycling

- Louisiana's CCPM recycling rate is ~26%, which is among the top 10 worst performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~4%. This is, among the lowest in the nation and is below average for the southern states.

Generation and Disposal

- Louisiana generates ~336 lbs./capita/year of CCPM, which is lower than the national average.
- Louisiana disposes of ~239 lbs./capita/year of these materials, which places it among the top 10 states that send the most material to landfill.
- Louisiana has one of the lowest average landfill fees in the nation. This does not incentivize waste diversion.

Data

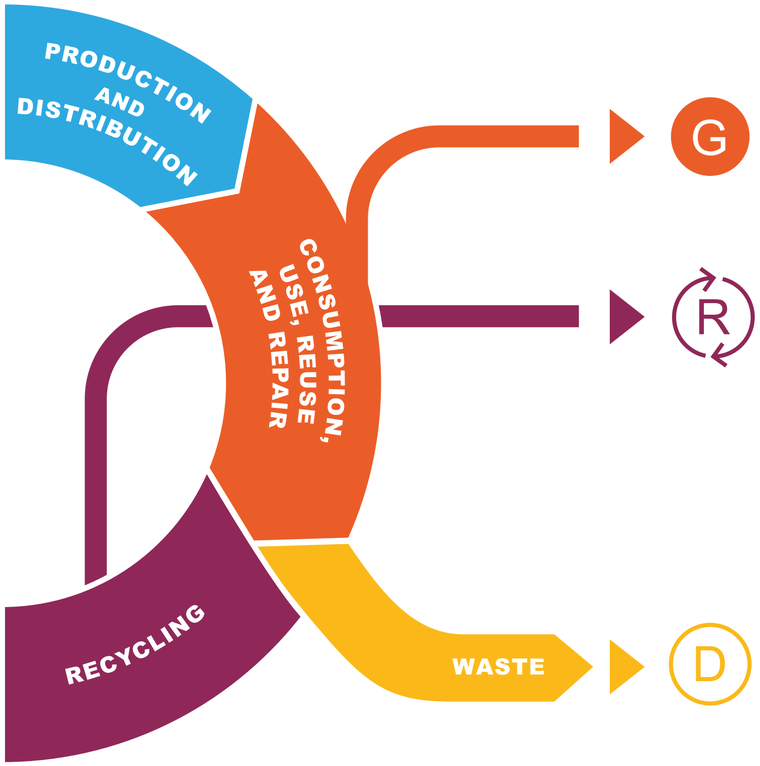
- Louisiana should consider conducting a waste characterization study to gain a better understanding of waste composition in the state. It should also consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities.

MAINE

KEY FACTS

POPULATION	**1,339,057**
PERCENT URBAN	**39%**
CENSUS SUB-REGION	**New England**
EPA REGION	**1**
PERFORMANCE	
CCPM RECYCLING RATE	**74%**
CCPM GENERATION RANK	**40**
CCPM RECYCLING RANK	**1**
CCPM RECYCLING RANK without Cardboard	**1**
CCPM DISPOSAL RANK	**1**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.25 million tons
376 lbs. per capita

PACKAGING RECYCLED
0.19 million tons
285 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.06 million tons
91 lbs. per capita

MAINE

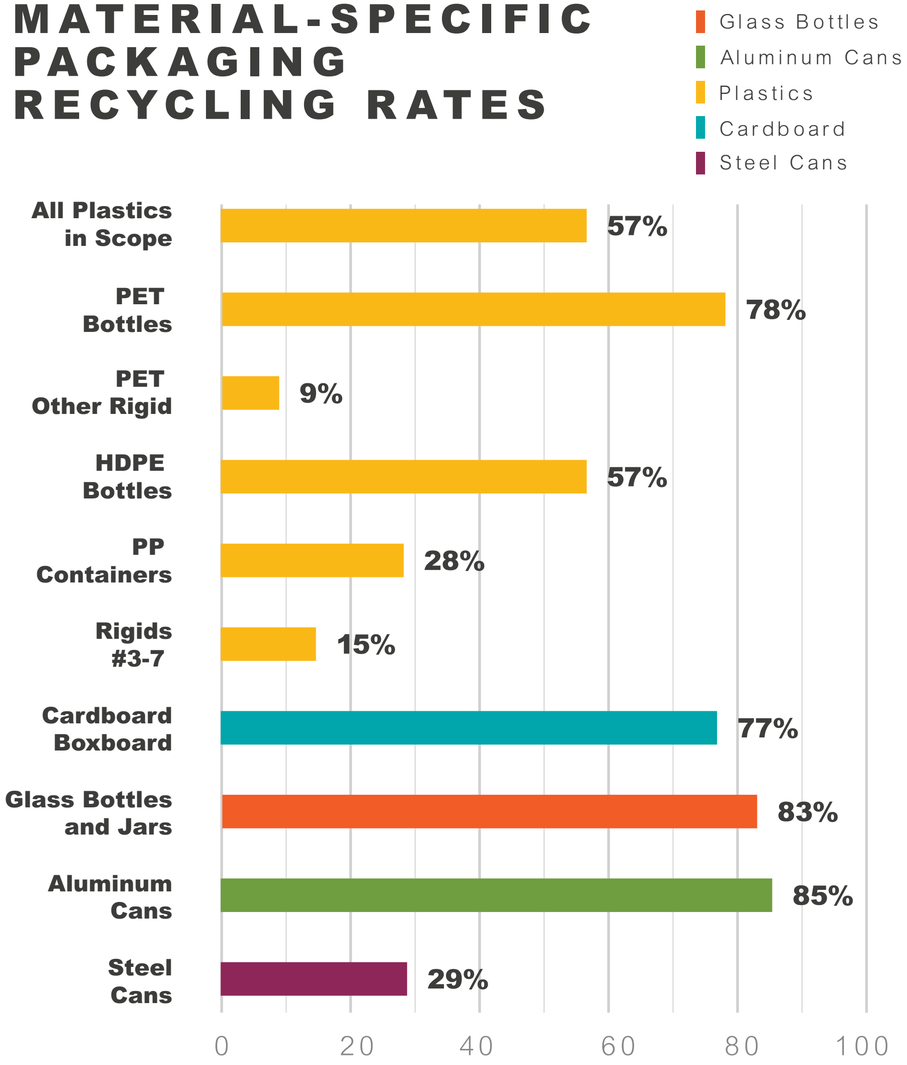
OVERVIEW

Maine has been a leader on recycling legislation, adopting some of the most progressive laws in the country. These include the nation's first electronics recycling bill and bans on single-use plastic carrier bags and expanded polystyrene (EPS) food containers.[88] Maine is also one of 10 US states that has implemented a bottle bill. The Maine Returnable Beverage Container Law was implemented in 1978 and requires a refundable deposit ($0.05 or $0.15 depending on container contents and size) to be placed on all beverage containers, except for dairy products and unprocessed cider.[89] In terms of scope, Maine's system is one of the most comprehensive, covering the widest range of beverages of any DRS in the US. In 2020, Maine considered a bill on EPR for packaging, but progress stalled due to the coronavirus pandemic.[90]

The Department of Environmental Protection (DEP) administers the electronics recycling program, beverage deposit program, and product stewardship programs for six other product categories*. [91]

**Batteries, mercury auto switches, cell phones, mercury thermostats, florescent light bulbs, and paint.*

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MAINE

DATA

Although the DEP reports annually on the performance of product stewardship programs, the recycling rates that are reported (including those for the beverage container program) are estimations, since the state does not require reporting of data from key stakeholders in the value chain.[92] The majority of reporting focuses on residential and commercial waste tonnages and composition, and there is little information about recycling performance. Overall tonnages are gathered through voluntary reporting and so are not comprehensive.

KEY TAKEAWAYS

Recycling

- Maine's CCPM recycling rate is ~74%, which is the highest in the country. Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~72%. This is again the highest rate in the country.
- In Maine, the materials with the highest recycling rates are those included in its DRS. This includes PET bottles (~78%), HDPE bottles (~57%), and glass bottles and jars (~83%). These rates are the highest recycling rates for all three categories in the nation. Maine also has the highest cardboard and boxboard recycling rate (~77%) and the 3rd highest aluminum (~85%) recycling rate. ~88% of all rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are captured through the state's deposit system.

Generation and Disposal

- Maine generates ~376 lbs./capita/year of CCPM. This places Maine among the top 20% of generation in the nation.
- With its recycling rate of ~74%, this leads to a disposal rate of ~91 lbs./capita/year, making Maine one of the 20% of states that dispose the least amount of material. On a per capita basis, Maine sends less CCPM to landfill each year than any other state.
- The average landfill fee in Maine is slightly below average for the northeastern states but is still one of the highest in the country. These higher disposal costs are likely to incentive at least some investment in recycling programs.

Data

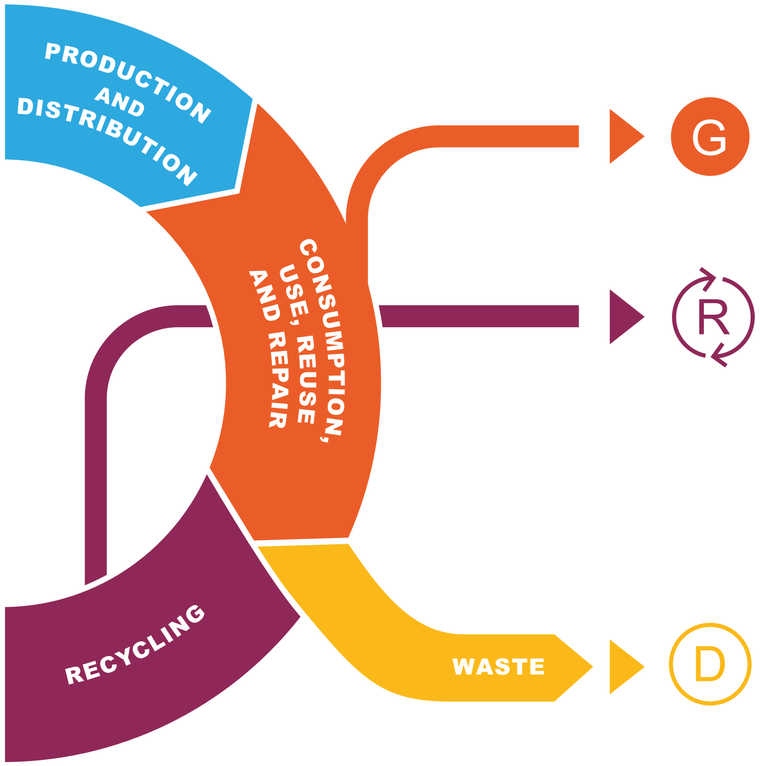
- Maine does not collect comprehensive recycling information. Improvements in data management, including moving from a voluntary to a mandatory reporting system for municipalities and facilities and carrying out periodic waste characterization studies, would help to identify where to target education, programs, and policy to drive up recycling rates. It is recommended that Maine review the reporting processes of those states that score highest on data systems and implement similar systems.

MARYLAND

KEY FACTS

POPULATION	**6,045,680**
PERCENT URBAN	**87.2%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**3**
PERFORMANCE	
CCPM RECYCLING RATE	**41%**
CCPM GENERATION RANK	**7**
CCPM RECYCLING RANK	**22**
CCPM RECYCLING RANK without Cardboard	**13**
CCPM DISPOSAL RANK	**17**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.93 million tons
309 lbs. per capita

PACKAGING RECYCLED
0.39 million tons
128 lbs. per capita

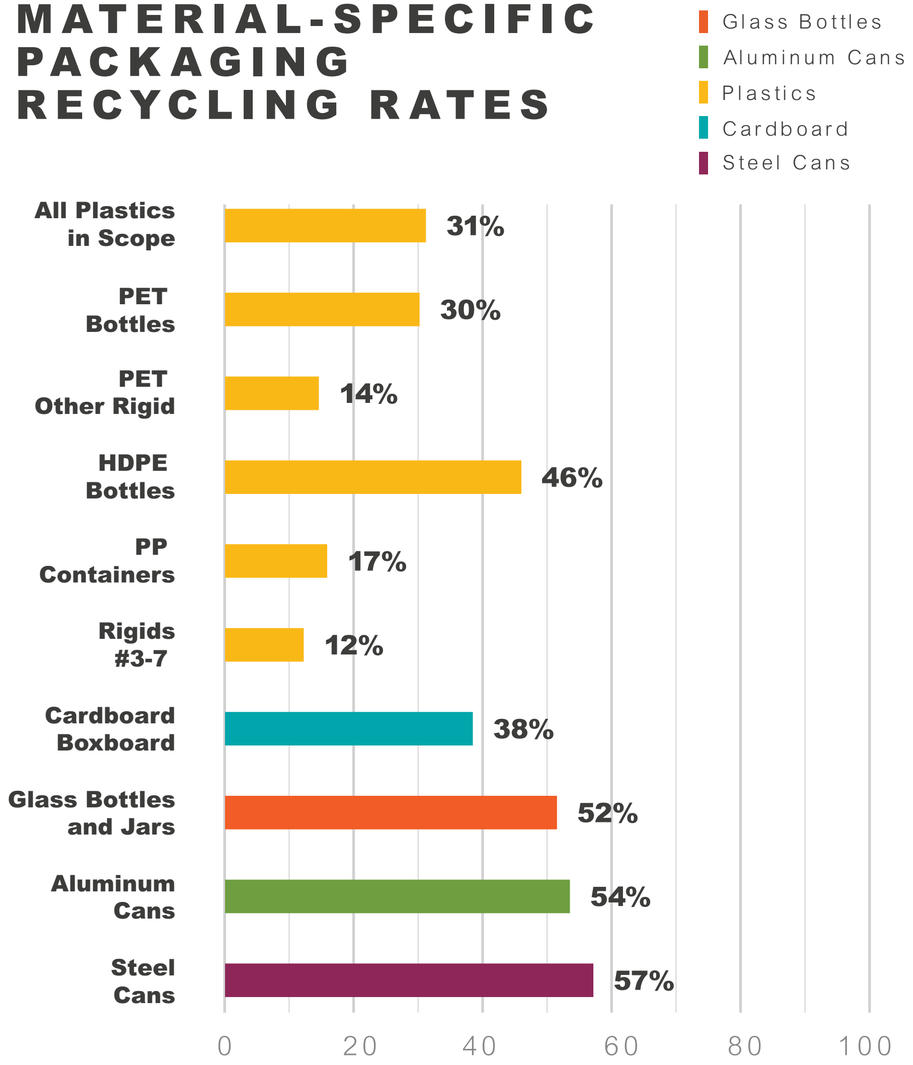
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.55 million tons
181 lbs. per capita

MARYLAND

OVERVIEW

The basis for Maryland's current recycling system is the Maryland Recycling Act of 1988,[93] which authorized the Maryland Department of the Environment to reduce the disposal of solid waste in state. In 2012, the law was updated to require state agencies to implement a recycling plan with a 30% recycling rate mandate.[94] Failure to meet these targets is met with penalties in the form of denials of construction permits. Additionally, for jurisdictions with populations greater than 150,000, it is mandated that those jurisdictions reach 35% recycling targets. [95]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MARYLAND

DATA

Maryland requires that counties report their tons recycled annually. This data is comprehensive in that it includes residential, commercial, and industrial tonnages. However, the data is also very high level, and due to the inclusion of industrial tons, recycling tonnages are difficult to attribute solely to MSW.[96] Maryland denotes recycling tons as Maryland Recycling Act (MRA) tons which includes MSW and industrial waste.

KEY TAKEAWAYS

Recycling

- Maryland's CCPM recycling rate is ~41%, which is the 22nd highest in the country, and lowest among the northeastern states.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~44%. This is the 13th highest rate in the country.
- In the state, ~38% of cardboard and boxboard is recycled, which is the lowest for the northeast region.

Generation and Disposal

- Maryland generates ~309 lbs./capita/year of CCPM making it one of the lowest per capita generation states.
- With a recycling rate of ~41% this leads to a disposal rate of ~181 lbs./capita/year. On a per capita basis, Maryland disposes less CCPM than 60% of other US states

Data

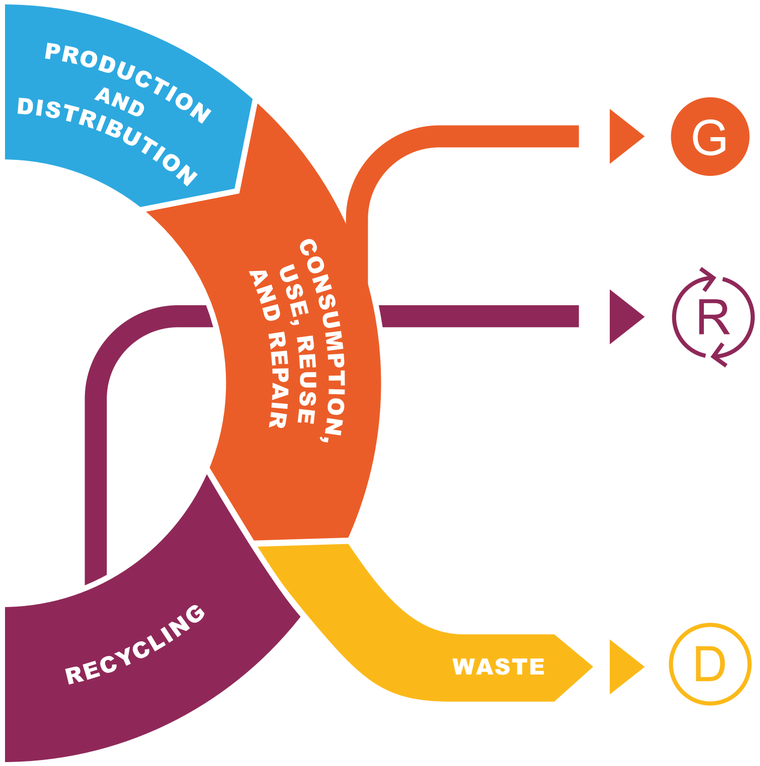
- Maryland has a comprehensive data system but could consider undertaking a MSW waste characterization study to better understand current statewide waste composition. Maryland should also consider expanding its data reporting system for municipalities and waste and recycling facilities to include a compositional breakdown.

MASSACHUSETTS

KEY FACTS

POPULATION	**6,882,635**
PERCENT URBAN	**92%**
CENSUS SUB-REGION	**New England**
EPA REGION	**1**
PERFORMANCE	
CCPM RECYCLING RATE	**52%**
CCPM GENERATION RANK	**42**
CCPM RECYCLING RANK	**14**
CCPM RECYCLING RANK without Cardboard	**3**
CCPM DISPOSAL RANK	**16**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.30 million tons
378 lbs. per capita

PACKAGING RECYCLED
0.69 million tons
201 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.61 million tons
177 lbs. per capita

MASSACHUSETTS

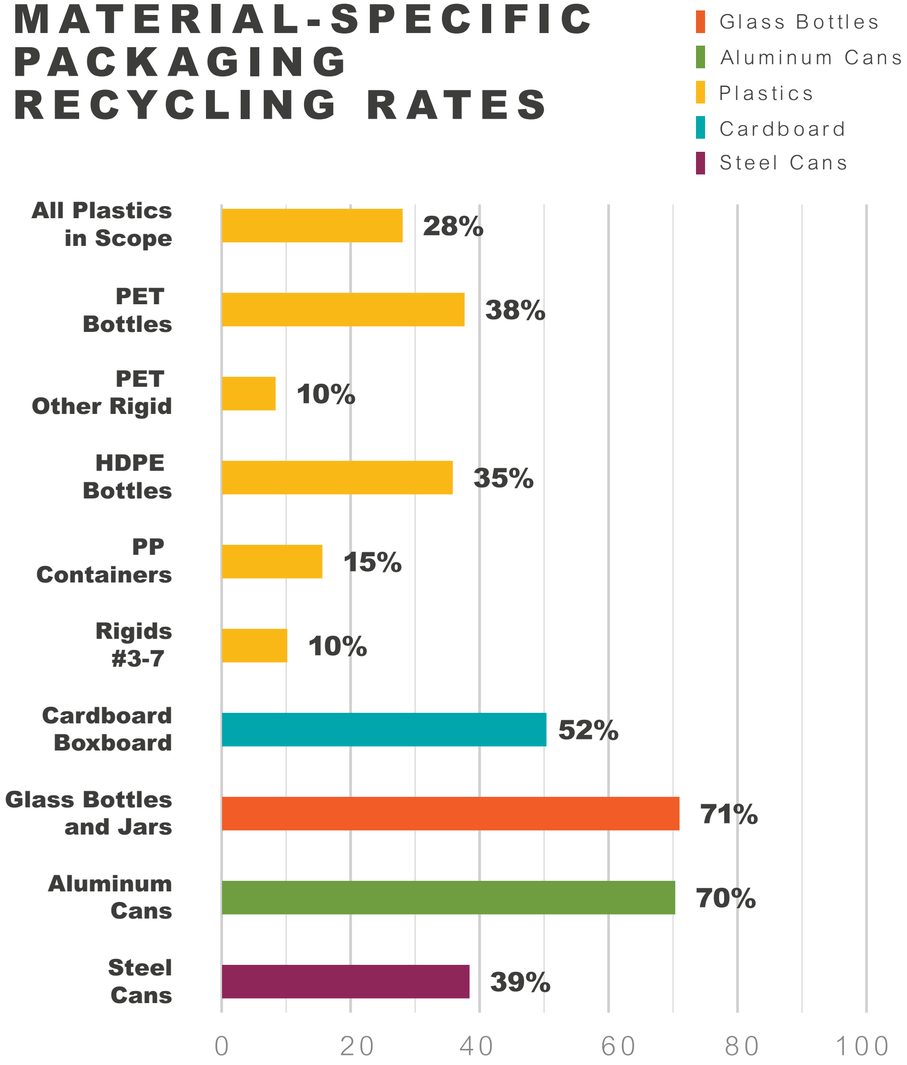
OVERVIEW

The Massachusetts Department of Environmental Protection (MassDEP) oversees waste-related services on a state level. MassDEP is focused on programs that move materials up the waste hierarchy; for example, it has established reuse and repair programs that provide municipal and micro grants for communities to operate swap shops, tool libraries and zero waste days, among other programs. It has also established a reduce and reuse working group to help in the development of a MassDEP Strategic Reduce and Reuse Action Plan as outlined in its 2030 Solid Waste Master Plan. [97]

Additionally, MassDEP has banned certain common recyclables from landfill.[98] The banned materials which fall under CCPM are glass and metal containers, some plastic containers and cardboard.

Massachusetts' Beverage Container Redemption Law (M.G.L. Chapter 94, Section 32)[99] has been in place since 1983, requiring that a refundable deposit of $0.05 be placed on beer, malt, carbonated soft drinks and mineral water containers.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MASSACHUSETTS

DATA

MassDEP reports regularly on the quantity of waste generated and diverted statewide. A more granular survey is sent out to municipalities to fill out annual tons recycled as well. However, reporting is only mandated for municipalities that have received Materials Recovery Program Grants.[100] Nonetheless, MassDEP reports comprehensive tons at a statewide level.

KEY TAKEAWAYS

Recycling

- Massachusetts' CCPM recycling rate is ~52%, which is 14th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~52%. This is the 3rd highest rate in the US.
- In Massachusetts, ~38% of PET bottles and ~71% of glass bottles and jars are recycled, which are both above average for the northeast region. Massachusetts has the second lowest cardboard and boxboard recycling rate (~52%) in the northeast region. ~45% of all rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are captured through the state's DRS.

Generation and Disposal

- Massachusetts generates ~378 lbs./capita/year of CCPM, which makes it one of the top 10 states with the highest per capita generation.
- With a recycling rate of ~52%, this leads to disposal rate of ~177 lbs./capita/year. On a per capita basis, Massachusetts disposes less CCPM than 60% of other states in the country.

Data

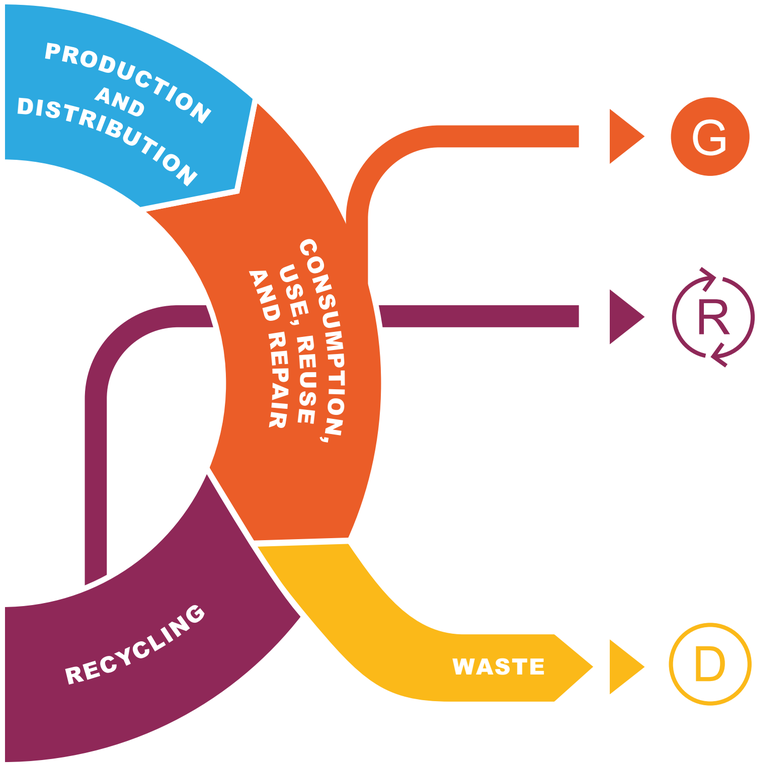
- Although Massachusetts has a comprehensive data system, the state could consider expanding their data reporting for municipalities and waste and recycling facilities to include a compositional breakdown and mandate reporting for all municipalities.

MICHIGAN

KEY FACTS

POPULATION	**9,986,857**
PERCENT URBAN	**74,6%**
CENSUS SUB-REGION	**East North Central**
EPA REGION	**5**
PERFORMANCE	
CCPM RECYCLING RATE	**40%**
CCPM GENERATION RANK	**29**
CCPM RECYCLING RANK	**24**
CCPM RECYCLING RANK without Cardboard	**8**
CCPM DISPOSAL RANK	**28**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.76 million tons
352 lbs. per capita

PACKAGING RECYCLED
0.71 million tons
142 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
1.05 million tons
210 lbs. per capita

MICHIGAN

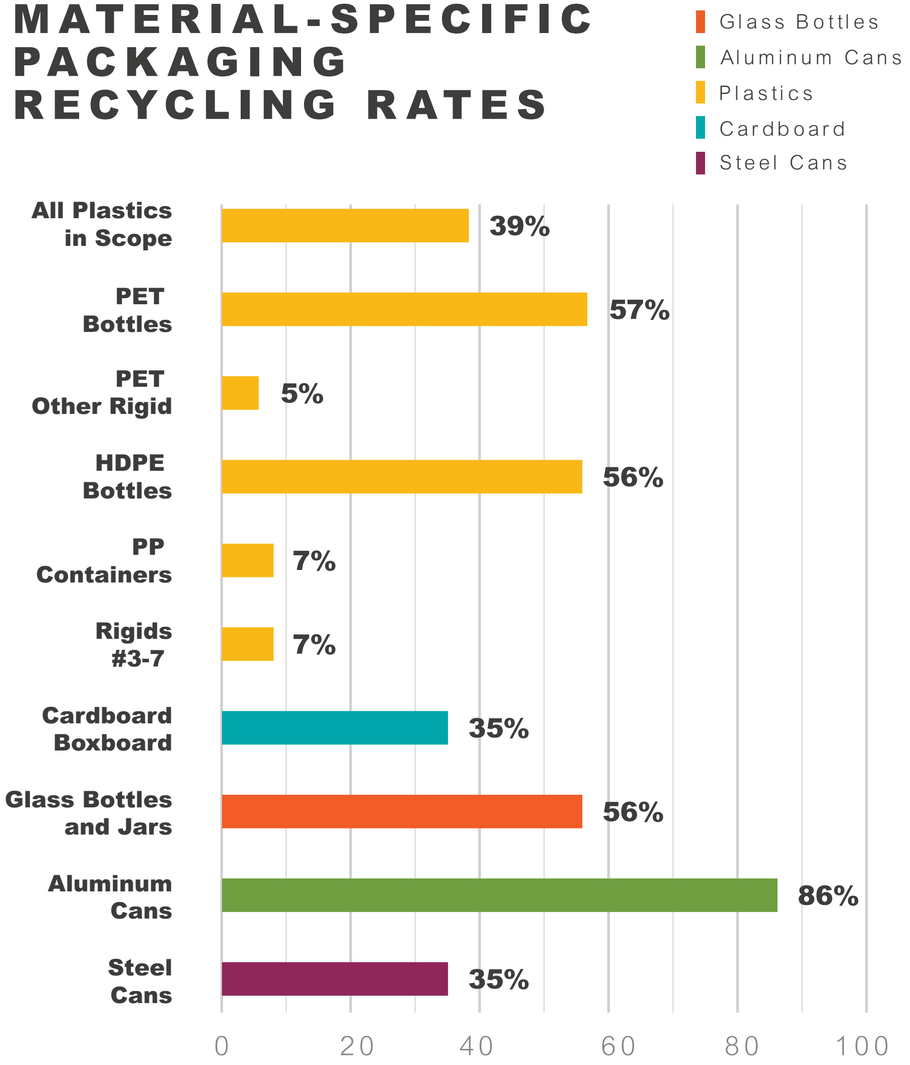
OVERVIEW

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) administers state solid waste and recycling policy, including Michigan's Solid Waste Policy of 2017, which establishes several goals such as finding uses for 50% of Michigan's MSW by 2025 and ensuring that all citizens have convenient access to residential recycling programs by 2020. [101]

Part 115, Solid Waste Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, was amended in 2004 to prohibit certain items from being disposed in landfill, including scrap tires and compost and yard trimmings.[102] It is unclear if this rule is enforced.

Michigan provides programs for recycling of electronics and scrap tires and offers grants for a variety of local recycling programs.[103] The Michigan Beverage Container Deposit Law was implemented in 1978 and applies a $0.10 deposit to soft drinks, carbonated natural or mineral water, or other non-alcoholic carbonated drinks, kombucha, beer, ale, mixed wine drinks and mixed spirit drinks.[104]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MICHIGAN

DATA

The Michigan EGLE reports annually on the amount of waste landfilled in the state.[105] To the extent possible, these reports identify the sources of the material as well as waste composition.

In June 2016, the state enacted requirements for certain recycling facilities to report the quantity of materials recycled each year as part of the Governor's recycling initiative, Part 175, Recycling Reporting, of Act 451. This law also encourages recycling facilities that fall outside these requirements to report voluntarily.[106] Therefore, annual recycling reports are now published.

KEY TAKEAWAYS

Recycling

- Michigan's CCPM recycling rate is ~40%, which is the 24th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~48%. This is the 8th highest rate in the country.
- The materials with the highest recycling rates—~57% for PET bottles, ~56% for HDPE bottles, and ~86% for aluminum cans—are those that are part of Michigan's DRS. Michigan's recycling rates for these materials are the highest among the midwestern states. ~52% of all rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are captured through the state's DRS.

Generation and Disposal

- Michigan generates ~352 lbs./capita/year of CCPM, which is around the median rate for states across the US.
- With its recycling rate of ~40%, this leads to disposal rate of ~210 lbs./capita/year. This places Michigan near the median for per capita disposal across the country.

Data

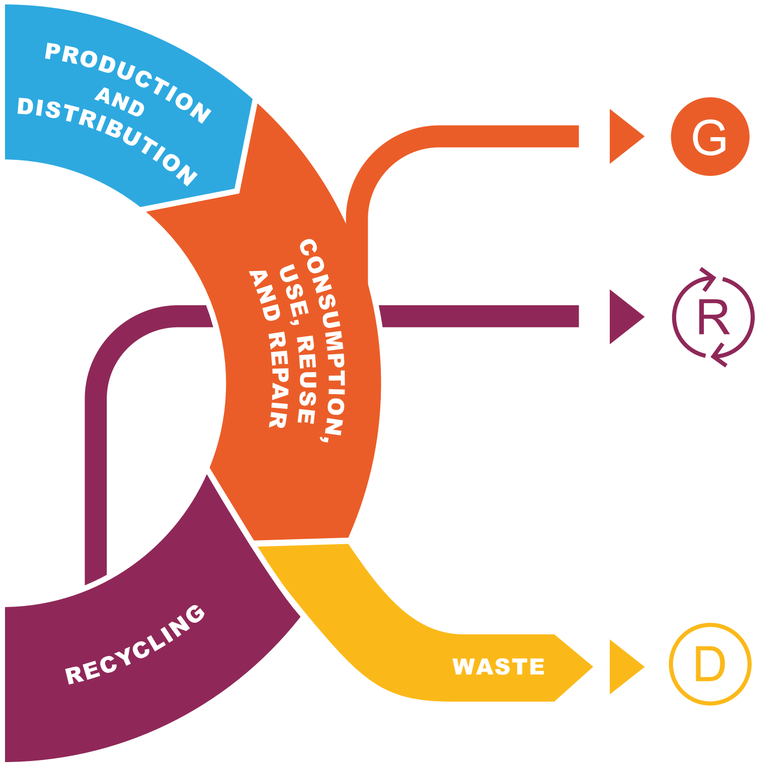
- Michigan has a comprehensive data system but could consider undertaking a more detailed MSW waste characterization study to better understand current statewide waste composition. The state should also consider expanding its data reporting system for municipalities and waste and recycling facilities to include a more detailed compositional breakdown.

MINNESOTA

KEY FACTS

POPULATION	**5,639,632**
PERCENT URBAN	**73.3%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**5**
PERFORMANCE	
CCPM RECYCLING RATE	**60%**
CCPM GENERATION RANK	**12**
CCPM RECYCLING RANK	**7**
CCPM RECYCLING RANK without Cardboard	**7**
CCPM DISPOSAL RANK	**6**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.93 million tons
331 lbs. per capita

PACKAGING RECYCLED
0.58 million tons
206 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.35 million tons
125 lbs. per capita

MINNESOTA

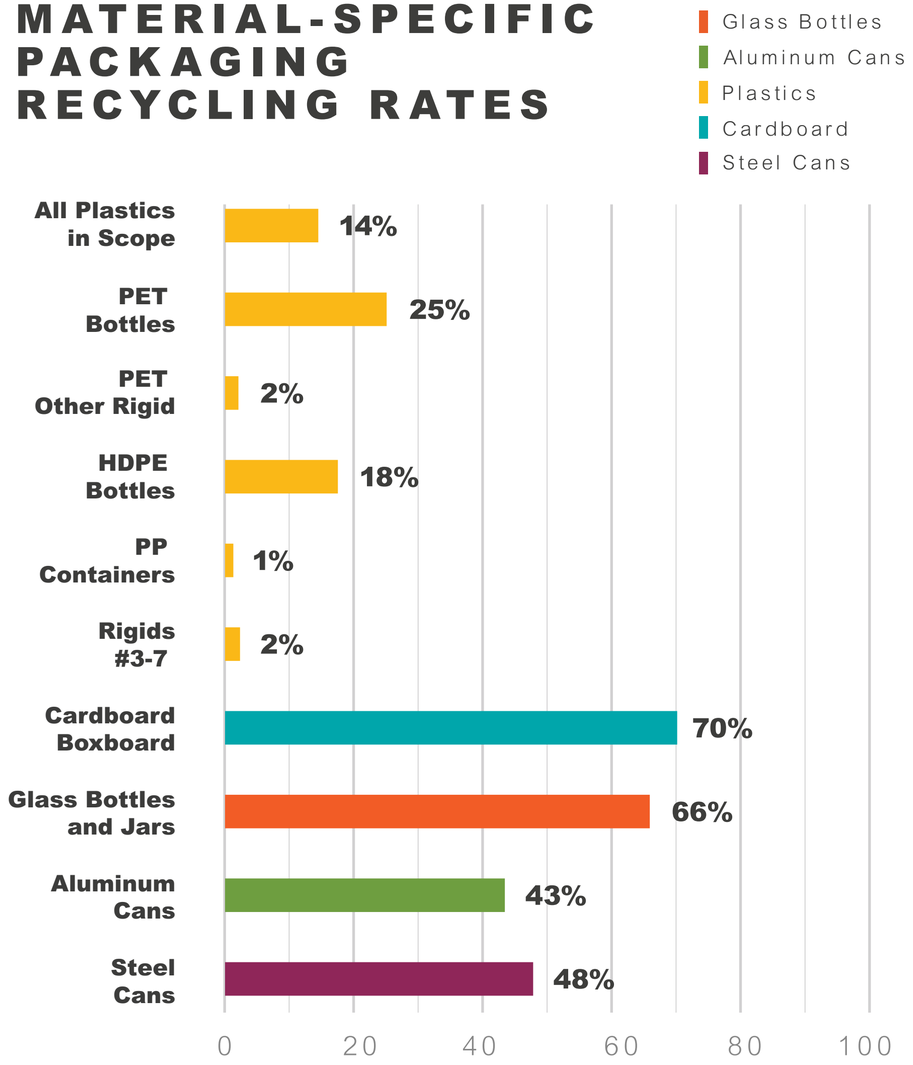
OVERVIEW

In 1989, the Minnesota Legislature set a goal requiring Greater Minnesota counties (outside of the seven-county metro area) to recycle a minimum of 35% (by weight) of total solid waste generation by 2030. The 2014 Legislature increased the recycling goal for the seven-county metro area from 50% to 75% of the MSW they generate by 2030.[107] A 2016 law (§115A.151) requires commercial businesses to recycle at least three material types.[108]

Counties in Minnesota retain control of solid waste management, including producing solid waste plans, which are updated every 6 or 10 years, depending on whether they are in a major metropolitan area or not. The Minnesota Pollution Control Agency (MPCA) supports local efforts and provides information on recycling, composting and solid waste management for the state, including managing reporting requirements.[109]

MPCA helps businesses develop uses for recycled materials by offering technical, financial, and marketing assistance.[110]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MINNESOTA

DATA

Minnesota's data reporting quality and systems are good. MPCA's annual Select Committee on Recycling and the Environment (SCORE) report provides detailed data by county on recycling tonnages.[111] The MPCA uses this information to make some generation and disposal estimates using data reported by haulers. Within the reports, there is some conflation around MSW, sometimes referring to total waste generated and sometimes to waste disposed. Minnesota also provides some equivalent greenhouse gas (GHG) emissions reporting associated with their solid waste management efforts.[112]

KEY TAKEAWAYS

Recycling

- Minnesota's CCPM recycling rate is ~60%, which ranks seventh highest in the country and second highest among the Midwest states.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~49%. This is seventh highest in the country.
- ~25% of PET bottles, ~66% of glass bottles and jars, ~70% of cardboard and boxboard, and ~43% of aluminum cans are recycled. Each of these rates is above average for states in the Midwestern region.

Generation and Disposal

- Minnesota generates ~331 lbs/capita/year of CCPM, making it one of the top 20 states with the lowest per capita generation.
- With its recycling rate of ~60%, this leads to disposal rate of ~125 lbs./capita/year. This places Minnesota among the top 10 states that dispose the least material of material per capita.

Data

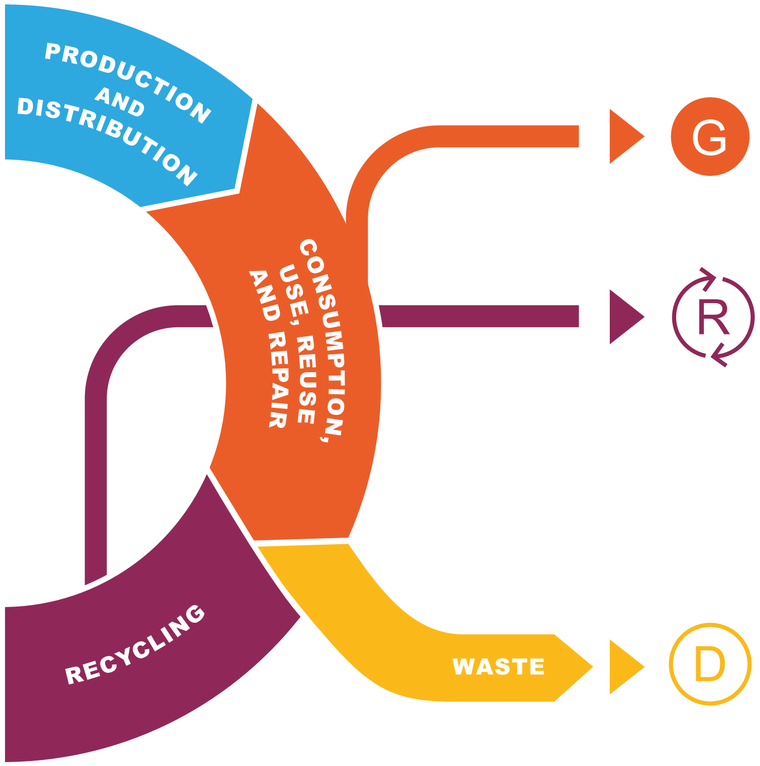
- Minnesota has a comprehensive data reporting system but should consider expanding it for municipalities and waste and recycling facilities to include a more detailed compositional breakdown.

MISSISSIPPI

KEY FACTS

POPULATION	**2,976,149**
PERCENT URBAN	**49%**
CENSUS SUB-REGION	**East South Central**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**17%**
CCPM GENERATION RANK	**24**
CCPM RECYCLING RANK	**49**
CCPM RECYCLING RANK without Cardboard	**45**
CCPM DISPOSAL RANK	**50**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.51 million tons
343 lbs. per capita

PACKAGING RECYCLED
0.09 million tons
63 lbs. per capita

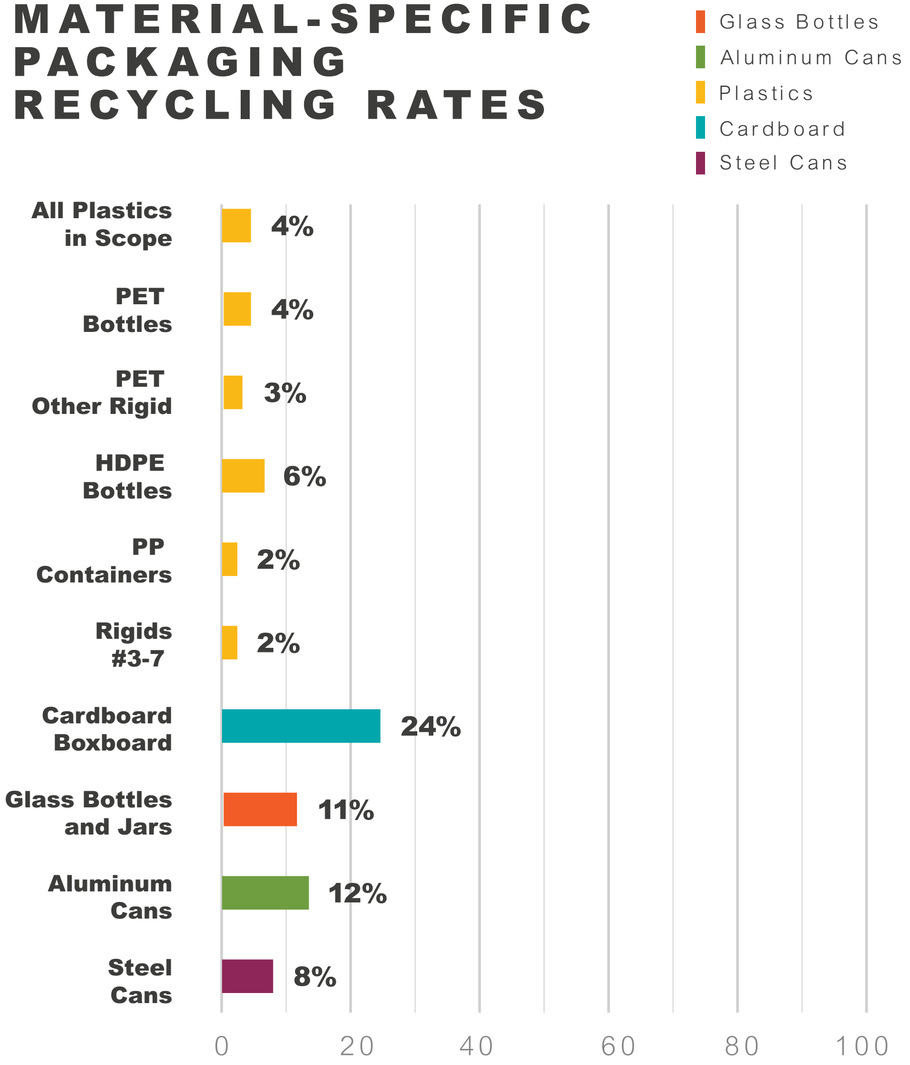
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.42 million tons
280 lbs. per capita

MISSISSIPPI

OVERVIEW

The Solid Waste Policy, Planning & Special Programs Branch of the Mississippi Department of Environmental Quality (MDEQ) oversees solid waste facilities statewide.[113] The MDEQ's Office of Pollution Control manages recycling and waste reduction in the state. Approximately 46% of counties in Mississippi do not currently have access to community recycling programs.[114]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MISSISSIPPI

DATA

A 2017 Status Report on Solid Waste Management provides tonnages disposed for MSW and industrial recycling.[115] To measure progress towards their 25% waste reduction goal, MDEQ is initiating a statewide recycling reporting program for all counties and municipalities.[116] However, no data from that reporting is available yet and no composition studies for garbage or recycling exist.[117]

KEY TAKEAWAYS

Recycling

- Mississippi's CCPM recycling rate is ~17%, which ranks the second lowest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~8%, which is below average for the Southern states.
- Regardless of whether cardboard and boxboard is included, Mississippi's recycling rates are among the lowest in the nation.

Generation and Disposal

- Mississippi generates ~343 lbs./capita/year of CCPM, which is around the median in the nation.
- Mississippi's low recycling rate leads to a high disposal rate of~ 280 lbs./capita/year, which ranks highest in the country.
- The state's average landfill fee is the lowest of all US states and is unlikely to incentivize increased diversion.

Data

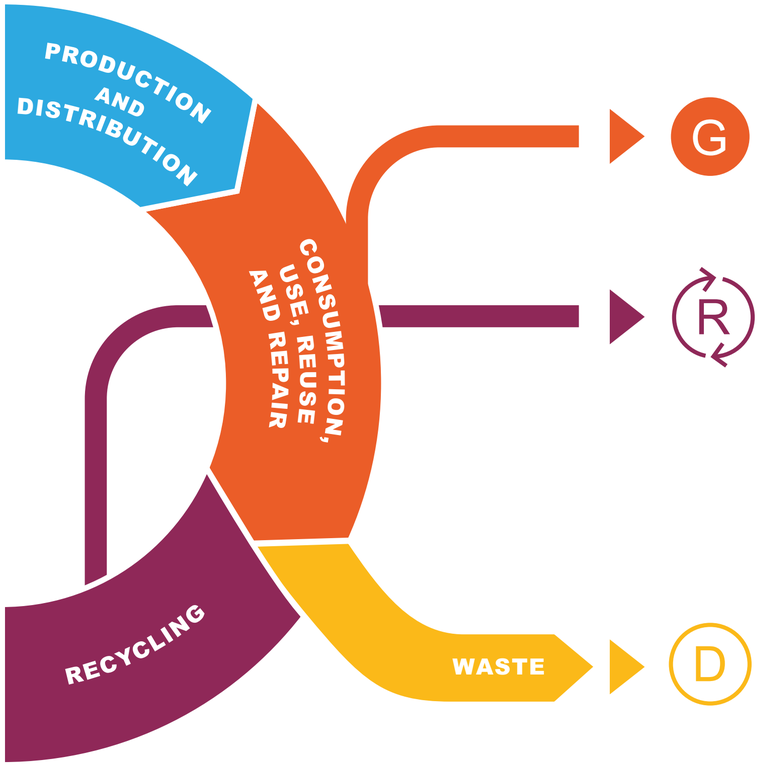
- Mississippi's data is very limited, but the MDEQ is initiating a statewide recycling reporting program for all counties and municipalities which should help fill in the data gaps. The state should also consider undertaking a statewide MSW waste characterization study to better understand current waste composition in the state.

MISSOURI

KEY FACTS

POPULATION	**6,137,428**
PERCENT URBAN	**70.4%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**7**
PERFORMANCE	
CCPM RECYCLING RATE	**46%**
CCPM GENERATION RANK	**33**
CCPM RECYCLING RANK	**15**
CCPM RECYCLING RANK without Cardboard	**22**
CCPM DISPOSAL RANK	**18**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.10 million tons
359 lbs. per capita

PACKAGING RECYCLED
0.53 million tons
174 lbs. per capita

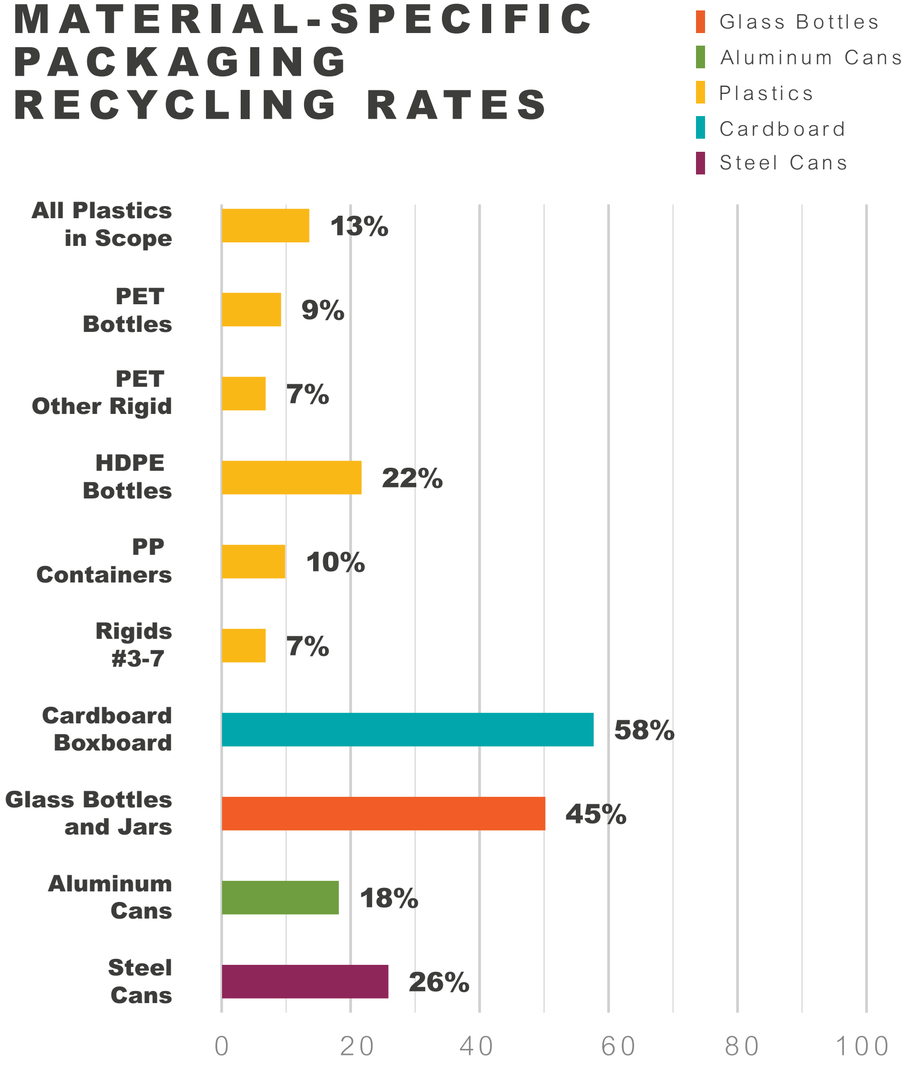
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.57 million tons
185 lbs. per capita

MISSOURI

OVERVIEW

The Missouri Department of Natural Resources (DNR), specifically the Division of Environmental Quality (DEQ), is responsible for overseeing waste management in the state.[118] The Waste Management Program helps residents better manage their solid wastes through the cooperative efforts of businesses, industry, and government. Missouri House Bill 722, preemptive legislation passed in 2015, prohibits local government entities from imposing bans or fees on paper and plastic bags. [119]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MISSOURI

DATA

Although the DEQ does not regularly publish data on the weight or composition of materials recycled in Missouri, upon request it provided recent (2018) diversion tonnages for solid waste districts in the state. Tonnage reports are published annually for transfer stations and sanitary landfills.[120] A statewide solid waste composition study was published in 2018,[121] which provides a detailed disposed waste composition by generator type, utilizing data collated from 2016-2017.

KEY TAKEAWAYS

Recycling

- Missouri's CCPM recycling rate is ~46%, which is fifteenth highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~30%. This ranks twenty-second highest in the US.
- ~45% of glass bottles and jars and ~59% of cardboard and boxboard are recycled. Both rates which are above the average for Midwestern states.

Generation and Disposal

- Missouri generates ~359 lbs./capita/year of CCPM, making it among the top 20 states with the highest per capita generation.
- With its recycling rate of ~46%, this leads to a disposal rate of ~185 lbs./capita/year. On a per capita basis, this places Missouri among the top 20 states that dispose the least amount of material nationwide.

Data

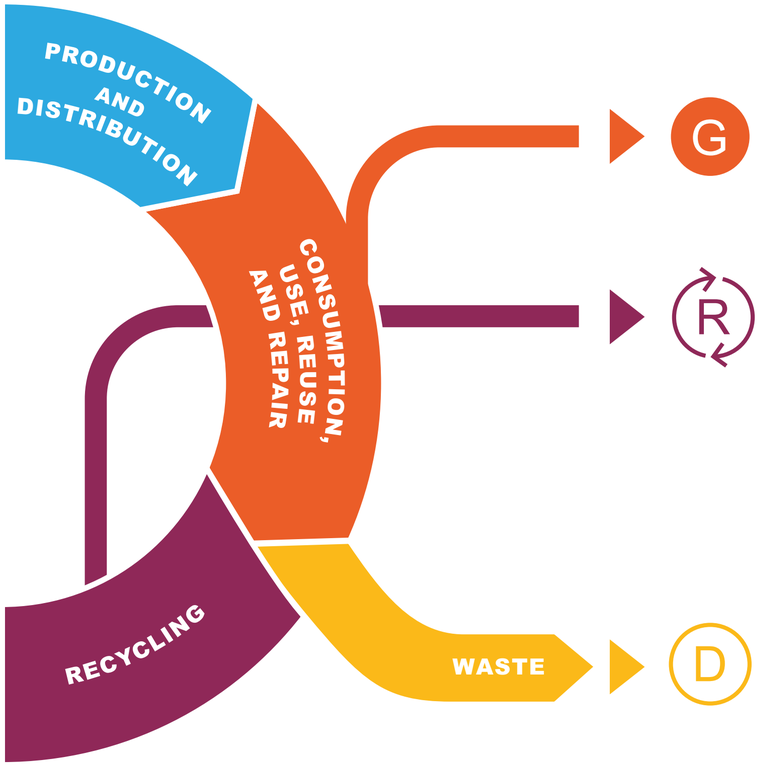
- Missouri has conducted a comprehensive waste characterization study but should consider expanding its data reporting system to include all municipalities and waste and recycling facilities in the state, not just for projects where funding was provided.

MONTANA

KEY FACTS

POPULATION	**1,068,778**
PERCENT URBAN	**56%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**7**
PERFORMANCE	
CCPM RECYCLING RATE	**33%**
CCPM GENERATION RANK	**16**
CCPM RECYCLING RANK	**36**
CCPM RECYCLING RANK without Cardboard	**36**
CCPM DISPOSAL RANK	**32**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.18 million tons
335 lbs. per capita

PACKAGING RECYCLED
0.06 million tons
121 lbs. per capita

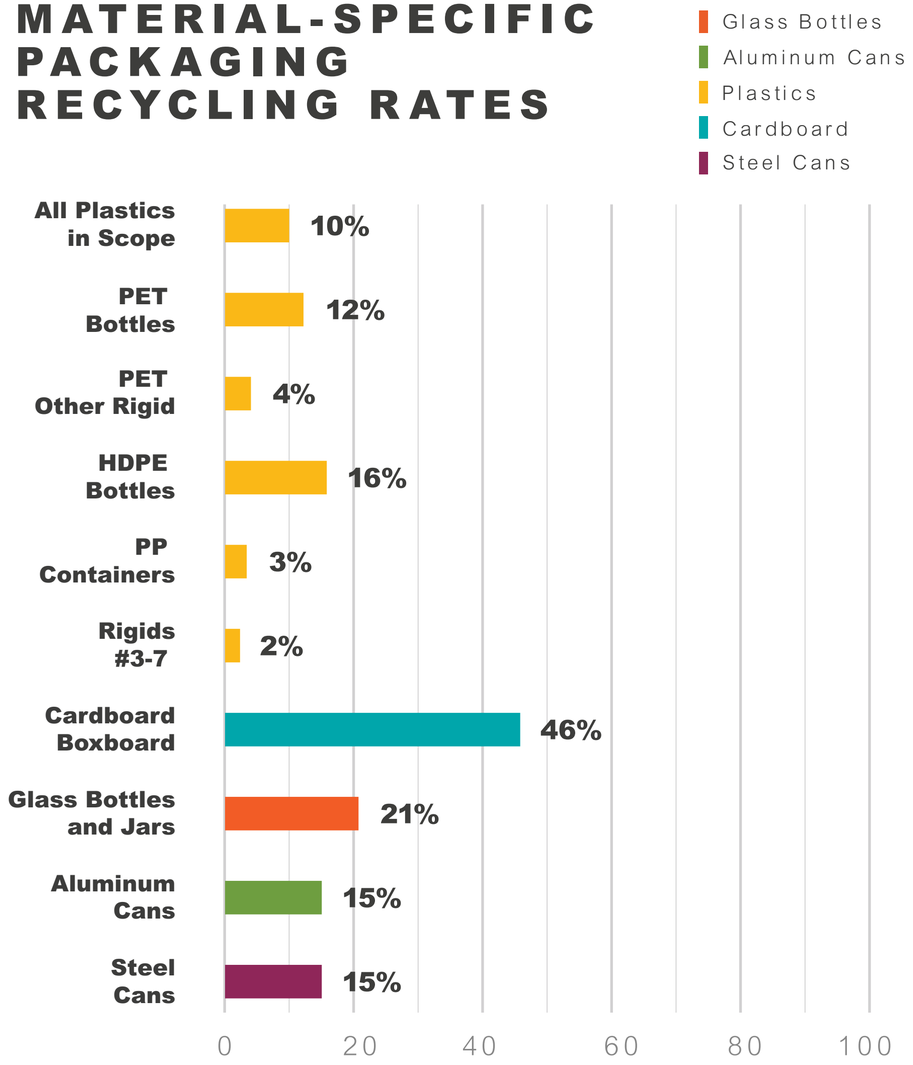
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.11 million tons
215 lbs. per capita

MONTANA

OVERVIEW

The Montana Department of Environmental Quality (DEQ) manages the state's solid waste facilities and programs, including community recycling.[122] The Integrated Waste Management Plan sets a diversion rate target of 22%, however, as of 2016, the state has only reached a 17% diversion rate.[123] In order to increase recycling, particularly in rural communities, the DEQ is promoting the hub and spoke model.[124]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



MONTANA

DATA

A 2016 study from the Montana DEQ provides data on the total tonnages of MSW recycled.[125] A 2018 Integrated Waste Management Plan provides information on the total tons of MSW for 2016 as well. Neither garbage nor recycling composition studies were available. [126]

KEY TAKEAWAYS

Recycling

- Montana's CCPM recycling rate is ~36%, which places it among the 20 lowest performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~15%.
- Regardless of whether cardboard and boxboard are included, Montana's CCPM recycling rates are below average for the Western states.

Generation and Disposal

- Montana generates ~335 lbs./capita/year of CCPM, which is less than ~60% of other US states.
- Montana's below average recycling rate leads to a disposal rate of ~210 lbs./capita/year, near the average for other states in per capita disposal across the western region.
- The average landfill fee for Montana is below average for the western states and is unlikely to incentivize increased waste diversion.

Data

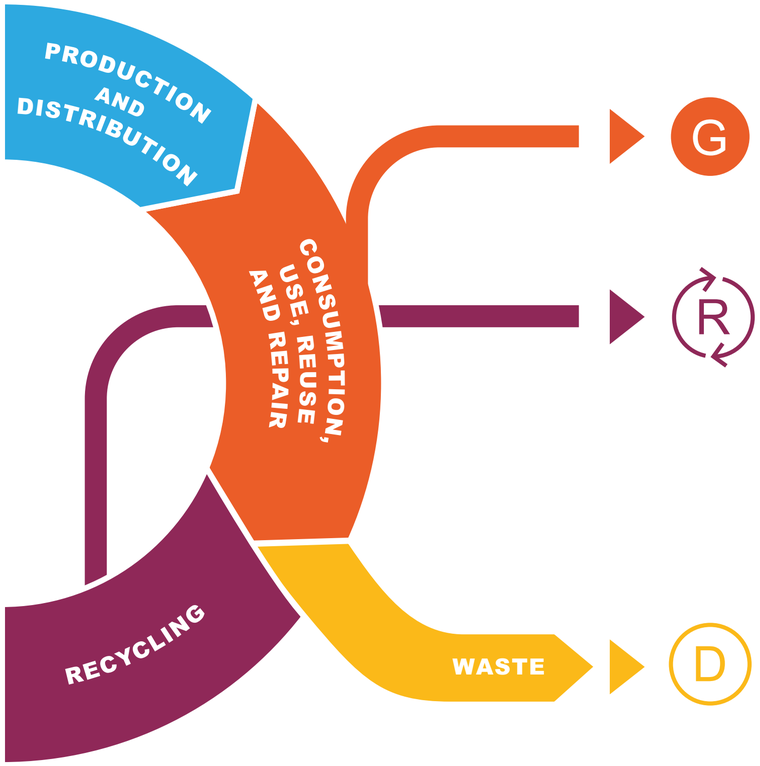
- Montana's data was limited. The state should consider setting up a mandatory data reporting system for municipalities and waste and recycling facilities. It should also consider undertaking a statewide MSW waste characterization study to better understand current waste composition in the state.

NEBRASKA

KEY FACTS

POPULATION	**1,934,408**
PERCENT URBAN	**73%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**7**
PERFORMANCE	
CCPM RECYCLING RATE	**46%**
CCPM GENERATION RANK	**39**
CCPM RECYCLING RANK	**16**
CCPM RECYCLING RANK without Cardboard	**40**
CCPM DISPOSAL RANK	**22**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.36 million tons
371 lbs. per capita

PACKAGING RECYCLED
0.16 million tons
170 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.19 million tons
201 lbs. per capita

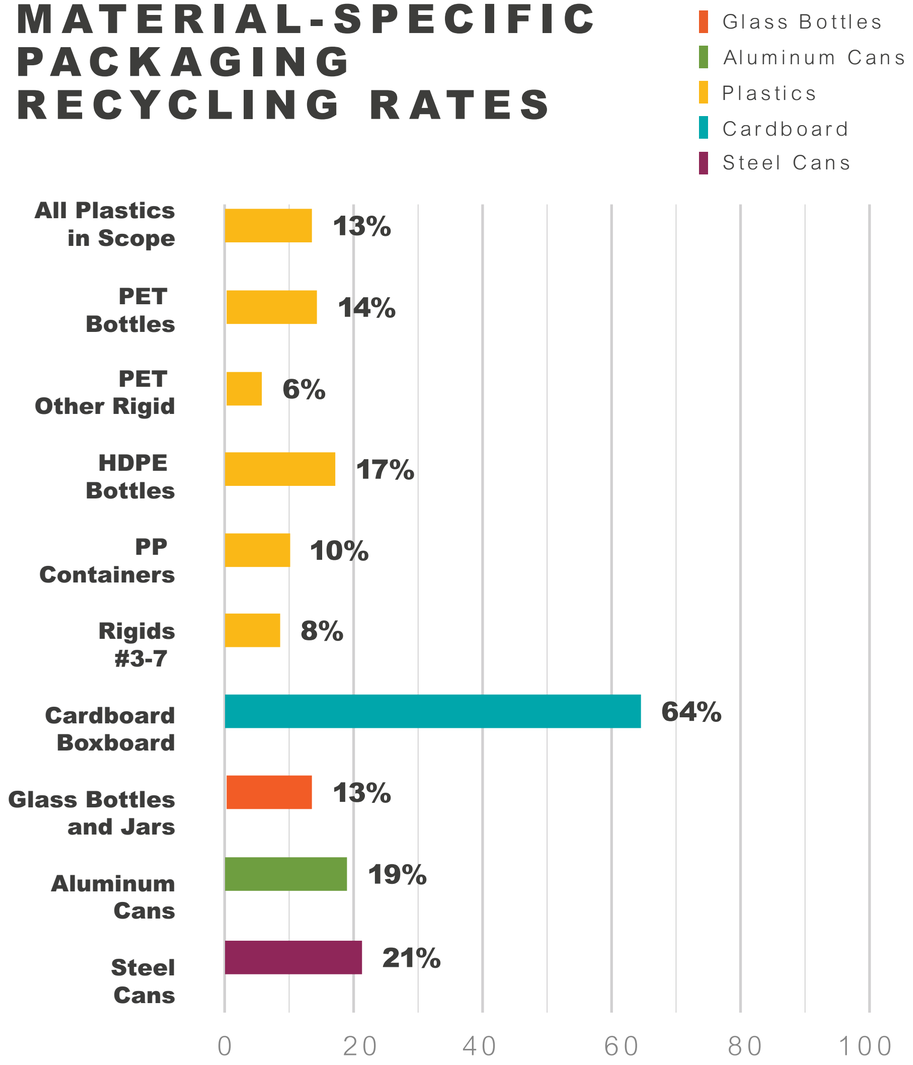
NEBRASKA

OVERVIEW

The Nebraska Department of Environment and Energy (DEE) manages solid waste facilities in the state. The state established voluntary waste diversion goals in 1992, aiming for 50% diversion by 2002. However, specific strategies to accomplish these goals were never set, and as of 2015 Nebraska has a recycling rate of about 17%.[129]

In 2015, approximately 66% of households in Nebraska had access to recycling collection or drop off within 30 miles, while only 19.6% of communities had access to curbside pickup.[130]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NEBRASKA

DATA

The University of Nebraska Public Policy Center published a 2015 Nebraska Recycling Study that provides statewide recycling tonnages broken down into 16 material categories using 2013 data. [131] The Nebraska DEE provided 2018 tonnages for total MSW landfilled in the state. [132]

KEY TAKEAWAYS

Recycling

- Nebraska's CCPM recycling rate is ~46%, which is the sixteenth highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~14%. This is 40th highest in the country.

Generation and Disposal

- Nebraska generates ~371 lbs./capita/year of CCPM, making it one of the 20 states with the highest per capita generation.
- With its recycling rate of ~46%, this leads to a disposal rate of ~201 lbs./capita/year. This places Nebraska close to the median of per capita disposal nationwide.

Data

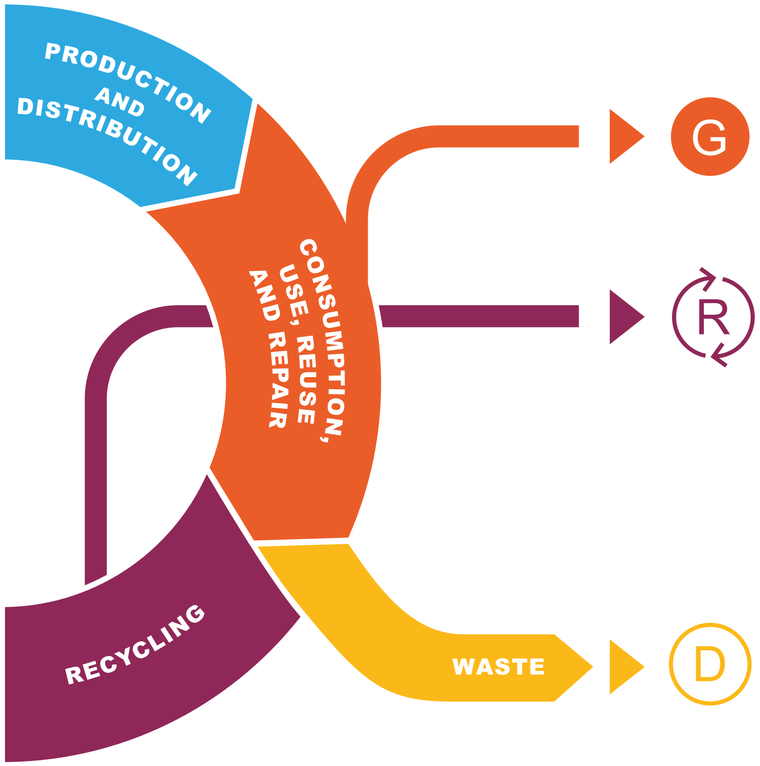
- Much of Nebraska's available waste data is from an academic study. The state should consider expanding regular reporting requirements to all municipalities and waste and recycling facilities. A statewide waste characterization study could provide further insight to allow for more comprehensive statewide planning.

NEVADA

KEY FACTS

POPULATION	**3,080,156**
PERCENT URBAN	**94%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**9**
PERFORMANCE	
CCPM RECYCLING RATE	**39%**
CCPM GENERATION RANK	**13**
CCPM RECYCLING RANK	**25**
CCPM RECYCLING RANK without Cardboard	**30**
CCPM DISPOSAL RANK	**19**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.50 million tons
333 lbs. per capita

PACKAGING RECYCLED
0.21 million tons
141 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.29 million tons
192 lbs. per capita

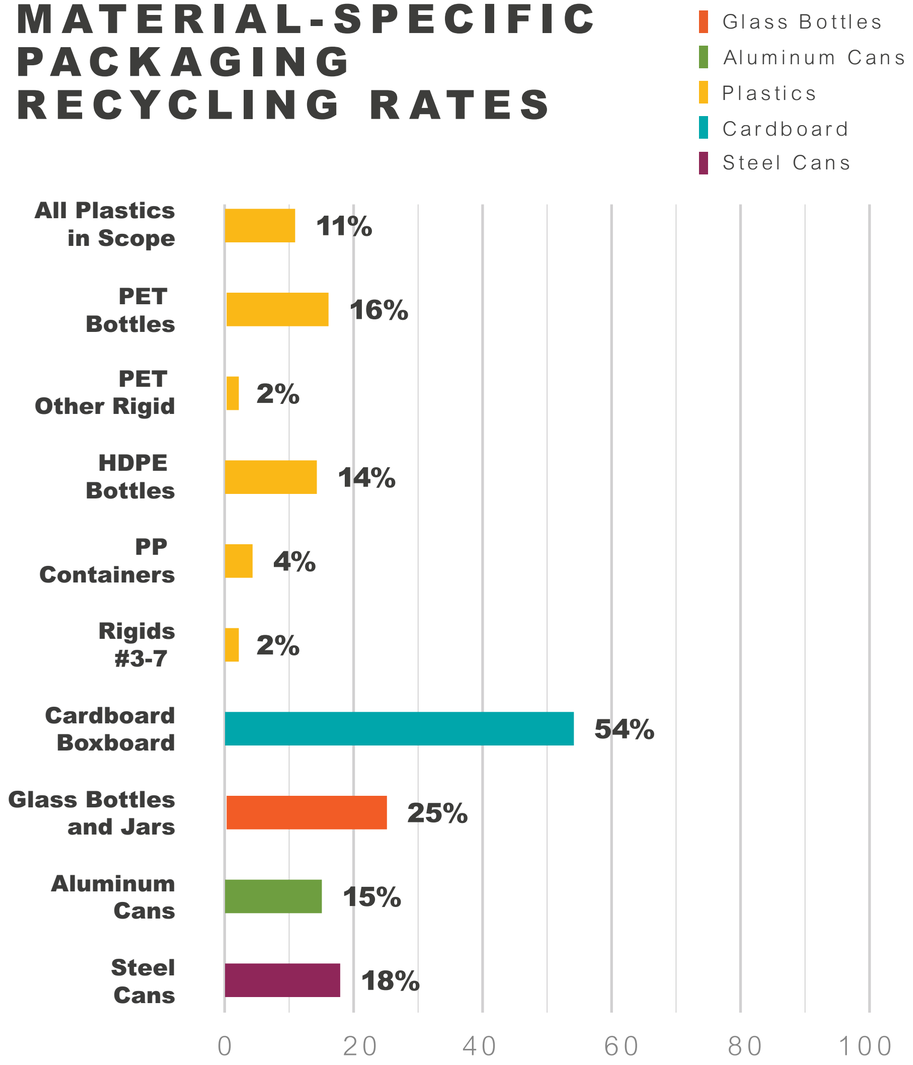
NEVADA

OVERVIEW

The Nevada Division of Environmental Protection's (NDEP) Bureau of Sustainable Materials manages waste permitting and compliance programs in the state.[133] In 1991, the Nevada Legislature adopted a recycling goal of 25%. Approximately 66% of households in Nevada had access to curbside recycling programs in 2019. [134]

Counties in Nevada are required to make certain recycling programs available depending on their population. Those with populations over 100,000 are required to have source separation, recycling centers, and household hazardous waste (HHW) collection programs in place, and those with populations between 45,000 and 100,000 are required to establish recycling centers and handle HHW. Counties with populations under 45,000 are exempt from the requirement to create recycling programs.[135]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NEVADA

DATA

The Nevada Division of Environmental Protection published a 2019 report that contains statewide garbage and recycling tonnages. It also includes a high-level recycled material composition breakdown into 8 material categories.[136] There is also a 2018 county-level recycling composition study that divides materials into about 50 categories.[137]

KEY TAKEAWAYS

Recycling

- Nevada's CCPM recycling rate is ~39%, which is around the median for the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~18%, indicating the impact of cardboard and boxboard.
- If cardboard and boxboard are included, Nevada's recycling rate is slightly higher than average for the Western states, but if these materials are excluded, it is lower than average for the region.

Generation and Disposal

- Nevada generates ~333 lbs./capita/year of CCPM, which is among the lowest ~40% for per capita generation in the nation.
- Nevada's average recycling rate leads to a disposal rate of ~192 lbs./capita/year, which is among the lowest ~40% for per capita disposal in the nation.
- The average landfill fee for Nevada is below average for states in the western region and unlikely to incentivize increased waste diversion.

Data

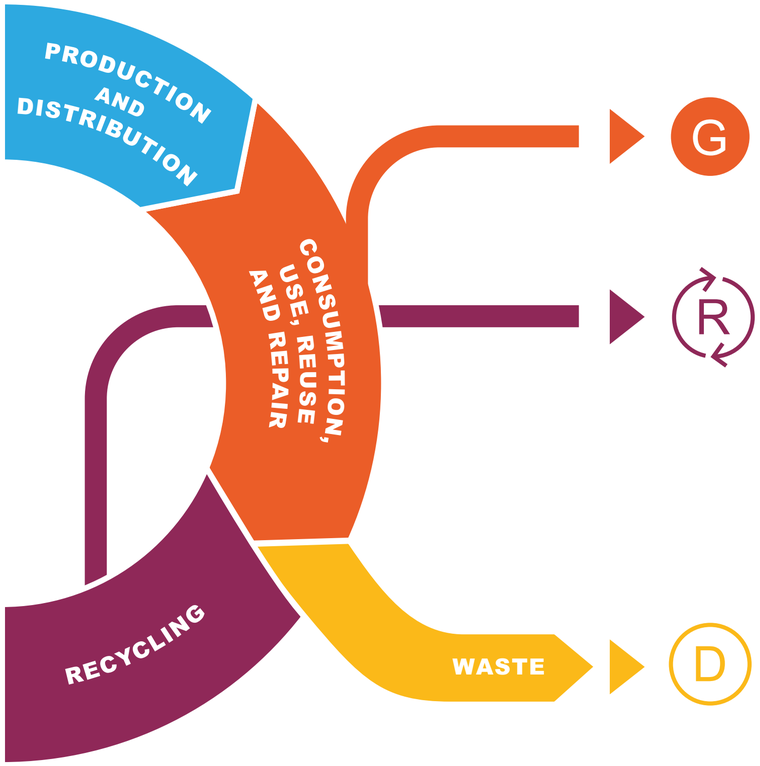
- Nevada published a recent and comprehensive report on waste and recycling, which provides insight into the current state of waste management in the state. A statewide waste characterization study would further enhance the ability to make future policy and programming decisions in the state.

NEW HAMPSHIRE

KEY FACTS

POPULATION	**1,359,711**
PERCENT URBAN	**60.3%**
CENSUS SUB-REGION	**New England**
EPA REGION	**1**
PERFORMANCE	
CCPM RECYCLING RATE	**44%**
CCPM GENERATION RANK	**43**
CCPM RECYCLING RANK	**19**
CCPM RECYCLING RANK without Cardboard	**19**
CCPM DISPOSAL RANK	**25**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.26 million tons
380 lbs. per capita

PACKAGING RECYCLED
0.12 million tons
173 lbs. per capita

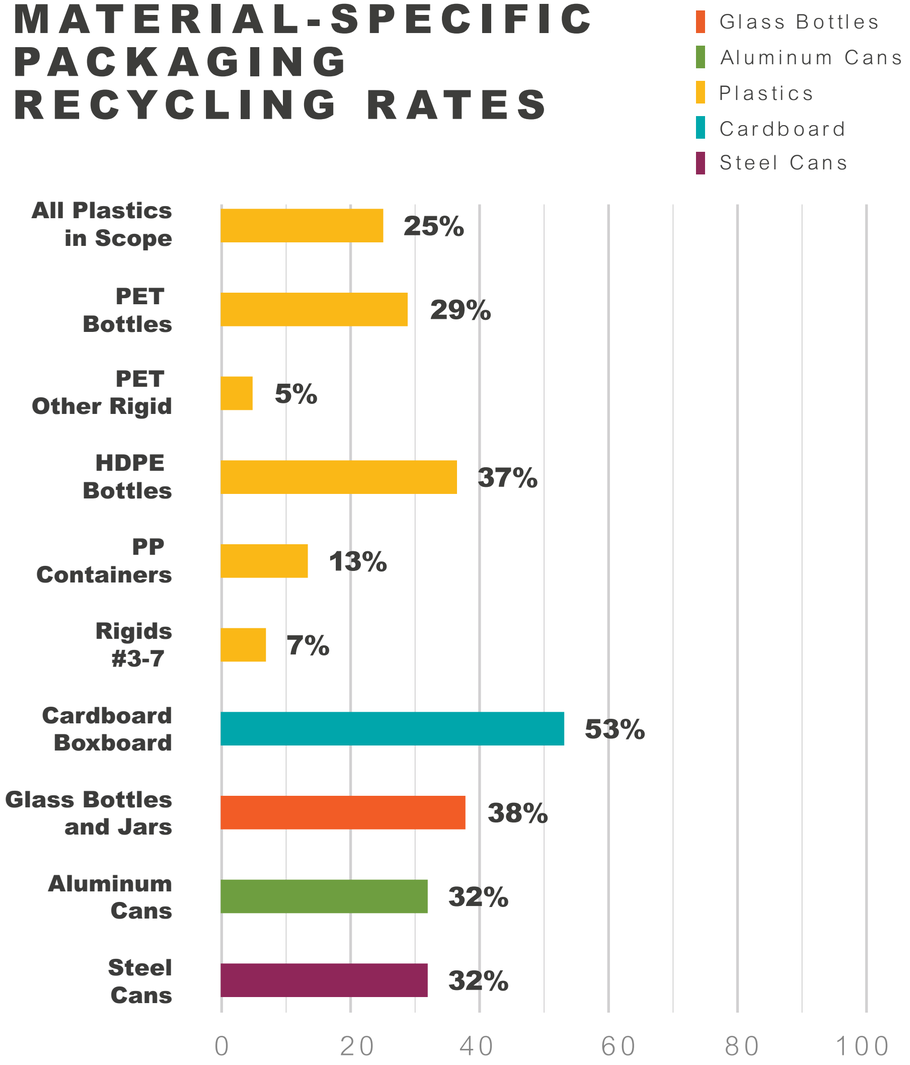
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.14 million tons
207 lbs. per capita

NEW HAMPSHIRE

OVERVIEW

The New Hampshire Department of Environmental Services (NHDES) oversees the management of solid waste through a combination of permitting, training and compliance programs.[138] There are no major statewide programs to enable recycling or waste diversion.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NEW HAMPSHIRE

DATA

New Hampshire produces a solid waste report every two years that details total waste disposal figures. Other statewide studies are minimal, and the last Waste Management Plan was produced in 2003, though an update is currently in progress.[139] There is little information on recycling tonnages or composition; as there are no MRFs in New Hampshire, all recycling is treated out-of-state.

KEY TAKEAWAYS

Recycling

- New Hampshire's CCPM recycling rate is ~44%, which ranks as the 19th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~32%. This is the 19th highest rate in the country.
- ~38% of glass bottles and jars and ~32% of aluminum cans are recycled. Both rates are the lowest for the Northeast region.

Generation and Disposal

- New Hampshire generates ~380 lbs./capita/year of CCPM, making it one of the highest per capita generation states.
- With a recycling rate of ~44%, this leads to a disposal rate of ~207lbs/capita/year. New Hampshire disposes close to the national median of CCPM per capita.

Data

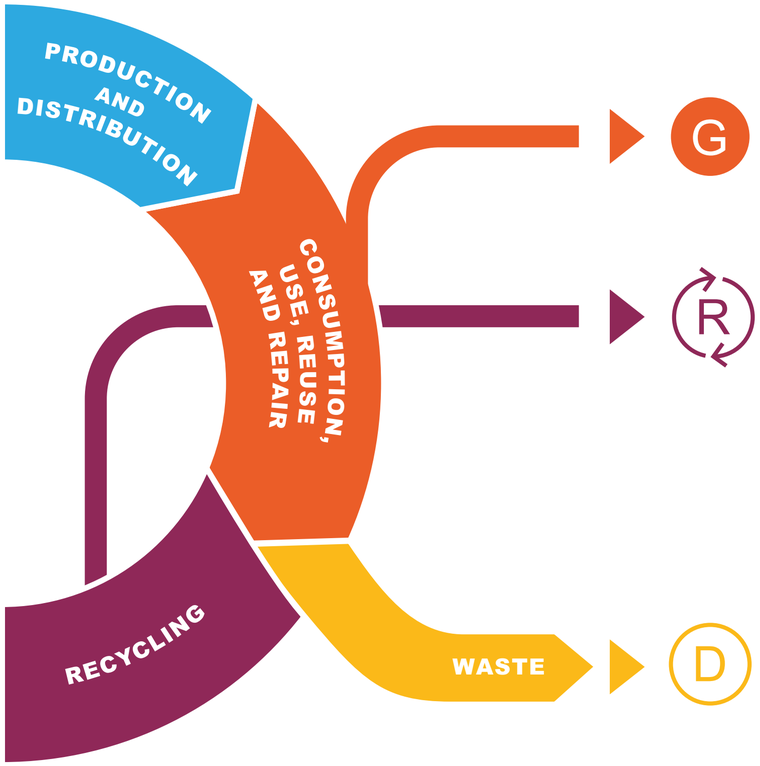
- New Hampshire should consider implementing a statewide waste characterization study to better understand waste composition in the state. It should also consider expanding and mandating data reporting for municipalities and waste and recycling facilities on a regular basis to provide accurate and up-to-date information.

NEW JERSEY

KEY FACTS

POPULATION	**8,882,190**
PERCENT URBAN	**94.7%**
CENSUS SUB-REGION	**Middle Atlantic**
EPA REGION	**2**
PERFORMANCE	
CCPM RECYCLING RATE	**62%**
CCPM GENERATION RANK	**49**
CCPM RECYCLING RANK	**6**
CCPM RECYCLING RANK without Cardboard	**9**
CCPM DISPOSAL RANK	**11**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.75 million tons
394 lbs. per capita

PACKAGING RECYCLED
1.10 million tons
247 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.66 million tons
148 lbs. per capita

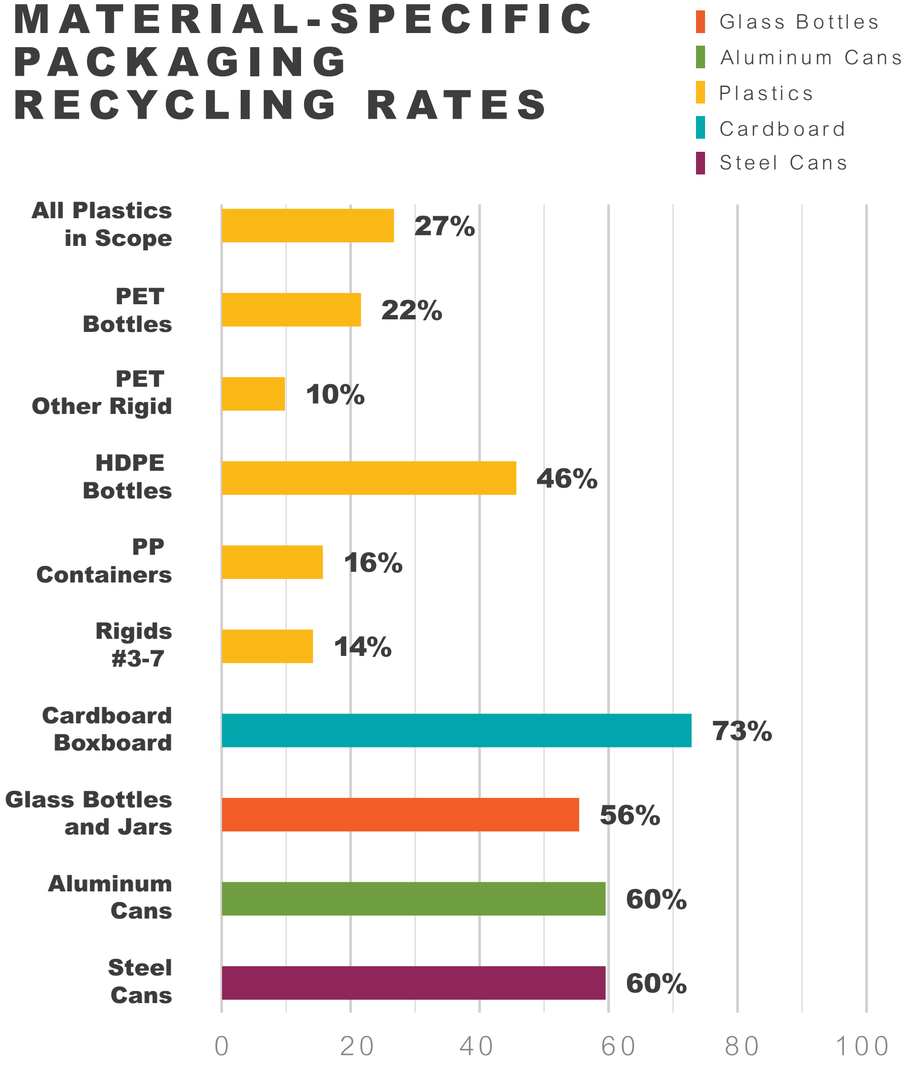
NEW JERSEY

OVERVIEW

The New Jersey Statewide Mandatory Source Separation and Recycling Act of 1987 (N.J.S.A. 13:1E-99.11 et seq. (Recycling Act)) required counties throughout New Jersey to develop recycling plans that mandated the recycling of at least three designated recyclable materials (in addition to leaves) and set goals of recycling 15% of the MSW stream in the first year of the program (increasing to 25% thereafter).[140] Legislation enacted in 1992 (P.L. 1992, c.167), amending the 1987 Recycling Act, increased the recycling goal to 50% of the MSW stream and 60% of the overall waste stream by the end of 1995.[141] Another important provision of New Jersey's Recycling Act was the establishment of a tax of $1.50 per ton on waste disposed at landfills and transfer stations; this was increased through the Recycling Enhancement Act of 2008.[142] The New Jersey Department of Environmental Protection (DEP) oversees these laws.

Recently introduced legislation explores requiring reporting by recycling centers on the current recycling market in the state, including, but not limited to the availability, location, and cost of markets for recycled materials and the nature and extent of contamination in the recycling stream.[143] Another bill was passed by the legislature in September 2020 to ban or limit the distribution of single-use plastic carryout bags, single-use paper carryout bags, polystyrene foam food service products and single-use plastic straws.[144]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NEW JERSEY

DATA

The Recycling Enhancement Act calls for 60% of the recycling tax fund to be used for recycling tonnage grants to municipalities and counties.[145] To receive these funds, municipalities must submit a grant report every year that includes information on recycling tonnages. Therefore, the DEP reports annually on total tonnages for recycling and disposal. New Jersey also undertook a litter survey in 2017. [146]

KEY TAKEAWAYS

Recycling

- New Jersey's CCPM recycling rate is ~62%, which is the sixth highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~46%. This is the ninth highest in the country.
- ~22% of PET bottles and ~56% of glass bottles and jars in the state are recycled; both rates are below average for Northeastern states. ~46% of HDPE bottles and ~73% of cardboard and boxboard are recycled, which is above average for states in the region.

Generation and Disposal

- New Jersey generates ~394 lbs./capita/year of CCPM, making it one of the highest per capita generation states.
- With a recycling rate of ~62%, this leads to ~148 lbs./capita/year disposed. On a per capita basis, New Jersey disposes less CCPM than 60% of other states in the US.
- New Jersey's average landfill tip fee is slightly above average compared to other states in the Northeast region.

Data

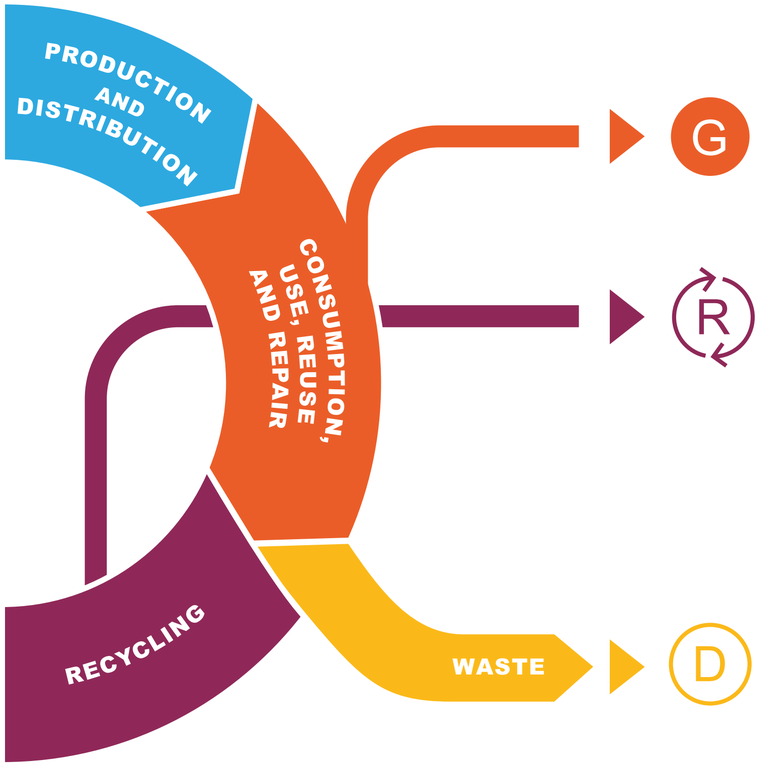
- New Jersey requires annual reporting by municipalities to receive state funds. This information enables better planning and is likely to have contributed to New Jersey's strong performance for CCPM recycling. A statewide waste characterization study could provide further insight to allow for more comprehensive statewide planning.

NEW MEXICO

KEY FACTS

POPULATION	**2,096,829**
PERCENT URBAN	**77.4%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**6**
PERFORMANCE	
CCPM RECYCLING RATE	**27%**
CCPM GENERATION RANK	**11**
CCPM RECYCLING RANK	**43**
CCPM RECYCLING RANK without Cardboard	**41**
CCPM DISPOSAL RANK	**38**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.34 million tons
326 lbs. per capita

PACKAGING RECYCLED
0.10 million tons
97 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.24 million tons
229 lbs. per capitaa

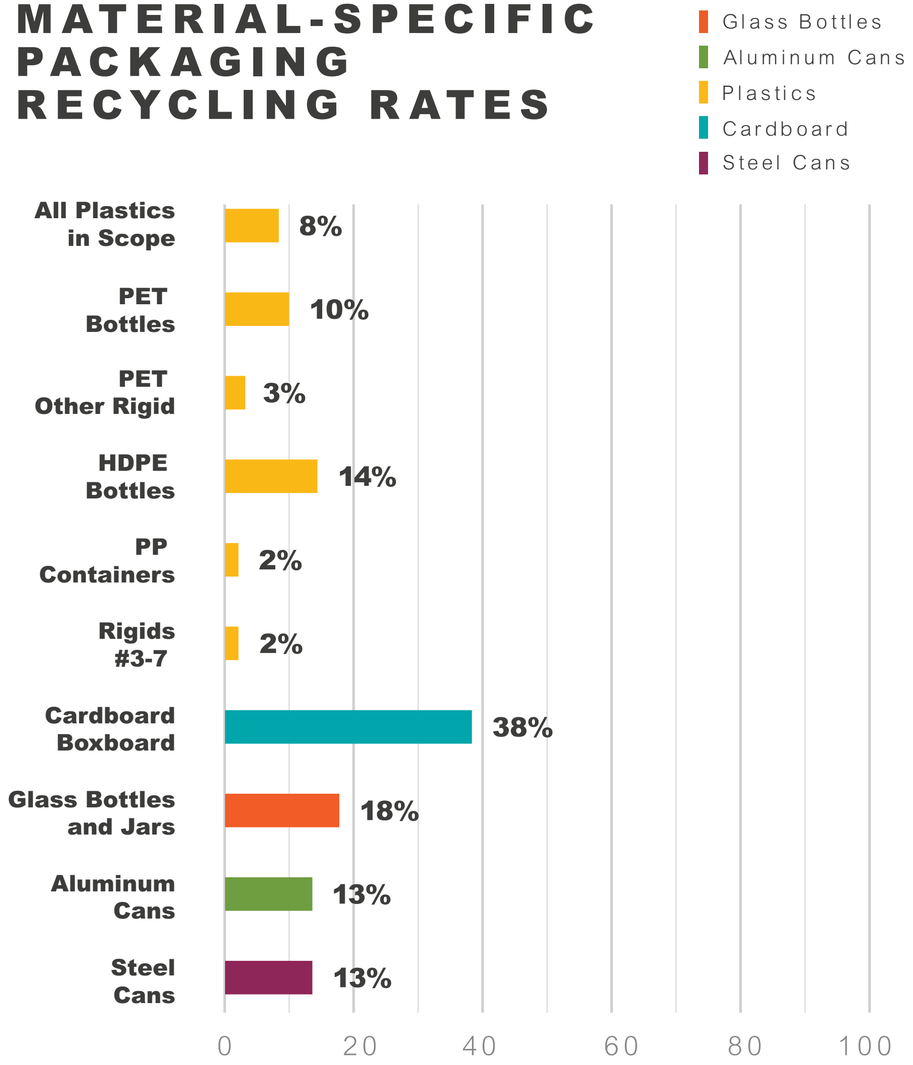
NEW MEXICO

OVERVIEW

The Solid Waste Bureau of the New Mexico Environment Department regulates solid waste facilities and operations in the state.[147] For rural areas, the state operates a hub and spoke collection model, so as of 2015, all but 16 communities had recycling collection, or a drop-off point within 30 miles. [148]

The 1990 New Mexico Solid Waste Act called for the creation of a Solid Waste Management Plan to set recycling goals, improve reporting, and make recommendations at the state level.[149] The state has published plans in 1993, 2007, and most recently in 2015.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NEW MEXICO

DATA

In 2015, the Environment Department published data on the amounts of solid waste managed statewide by county.[150] No statewide waste characterization studies have been conducted in New Mexico to date.[151]

KEY TAKEAWAYS

Recycling

- New Mexico's CCPM recycling rate is ~27%, which is among the 10 lowest performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~13%.
- Regardless of whether cardboard and boxboard are included, New Mexico's CCPM recycling rates are below average for the Western states.

Generation and Disposal

- New Mexico generates ~326 lbs./capita/year of CCPM, which is less than ~60% of other US states.
- New Mexico's low recycling rate leads to a disposal of rate of ~229 lbs./capita/year, which is higher than the average for western states and among the 20 worst performing states in the nation.
- The average landfill fee for New Mexico is below average for the Western region.

Data

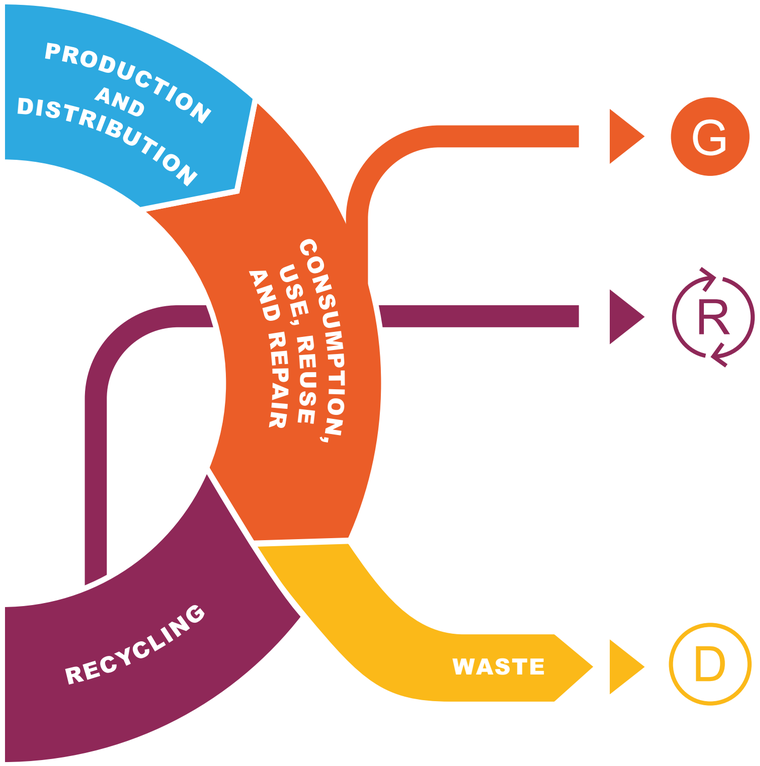
- New Mexico should consider implementing a statewide waste characterization study to better understand waste composition in the state. It should also consider expanding and mandating data reporting system for municipalities and waste and recycling facilities on a regular basis to provide accurate and up-to-date information.

NEW YORK

KEY FACTS

POPULATION	**19,453,561**
PERCENT URBAN	**87.9%**
CENSUS SUB-REGION	**Mid-Atlantic**
EPA REGION	**2**
PERFORMANCE	
CCPM RECYCLING RATE	**58%**
CCPM GENERATION RANK	**3**
CCPM RECYCLING RANK	**11**
CCPM RECYCLING RANK without Cardboard	**6**
CCPM DISPOSAL RANK	**5**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
2.83 million tons
290 lbs. per capita

PACKAGING RECYCLED
1.64 million tons
168 lbs. per capita

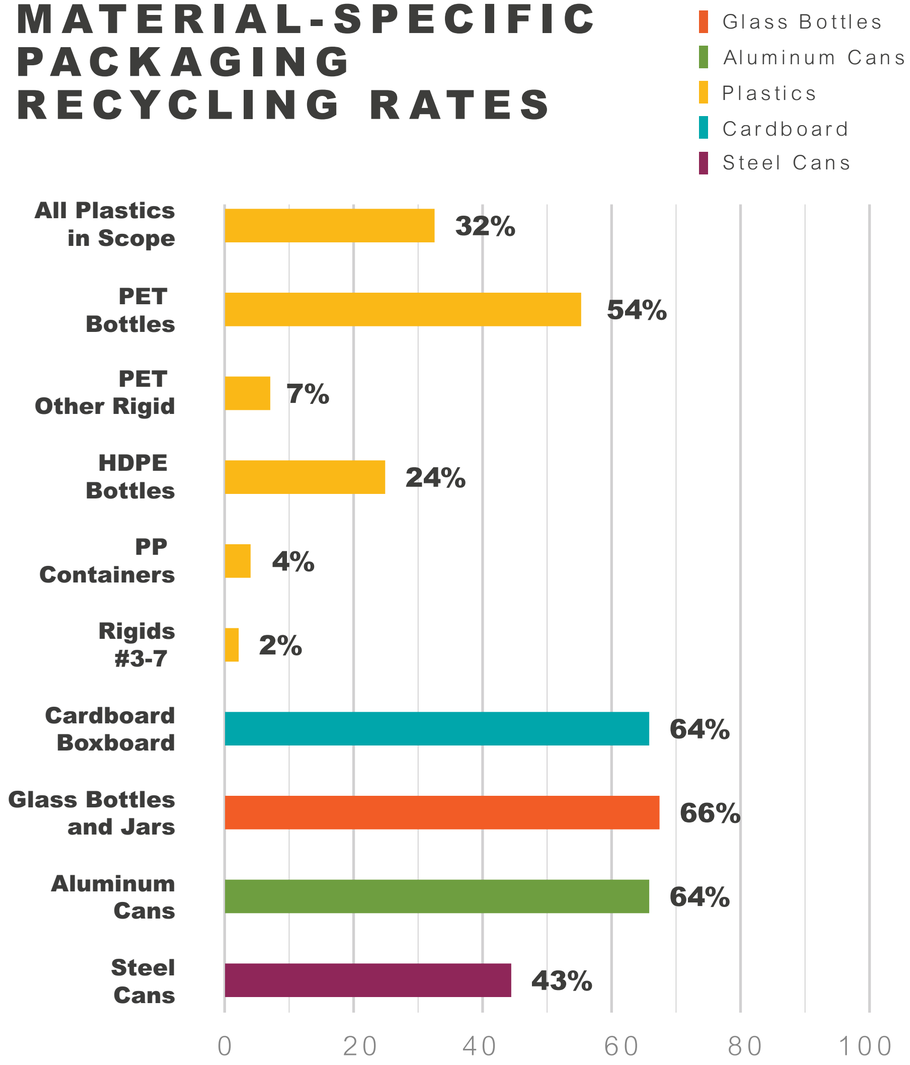
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
1.19 million tons
122 lbs. per capita

NEW YORK

OVERVIEW

New York State has multiple laws that mirror product stewardship principles. It currently has product stewardship programs in place for electronics and batteries and has a declaration to pursue extended producer responsibility (EPR) programs.[152] The New York Returnable Beverage Container Act of 1982 requires a refundable deposit of $0.05 to be placed on eligible beverage containers made of plastic, metal, and glass.[153] Additionally, facilities are required to report annual tons to the state's Department of Environment Conservation (DEC). New York City has mandated commercial recycling for businesses as well. [154]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NEW YORK

DATA

The state of New York supplied facility level data on recycling for 2014.[155] No statewide waste characterization studies have been conducted to date.

KEY TAKEAWAYS

Recycling

- New York's CCPM recycling rate is ~58%, which is the 11th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~51%. This is the sixth highest in the country.
- ~54% of PET bottles are recycled, which is the second highest rate in the northeast region and fifth highest in the nation. ~63% of all rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are captured through the state's DRS. This is the second highest within the Northeast region.

Generation and Disposal

- New York generates ~290 lbs./capita/year of CCPM, placing it among the top 10 states with the lowest per capita generation.
- With a recycling rate of ~58%, this leads to ~123 lbs./capita/year disposed. On a per capita basis, New York disposes less CCPM than 80% of other states in the country.

Data

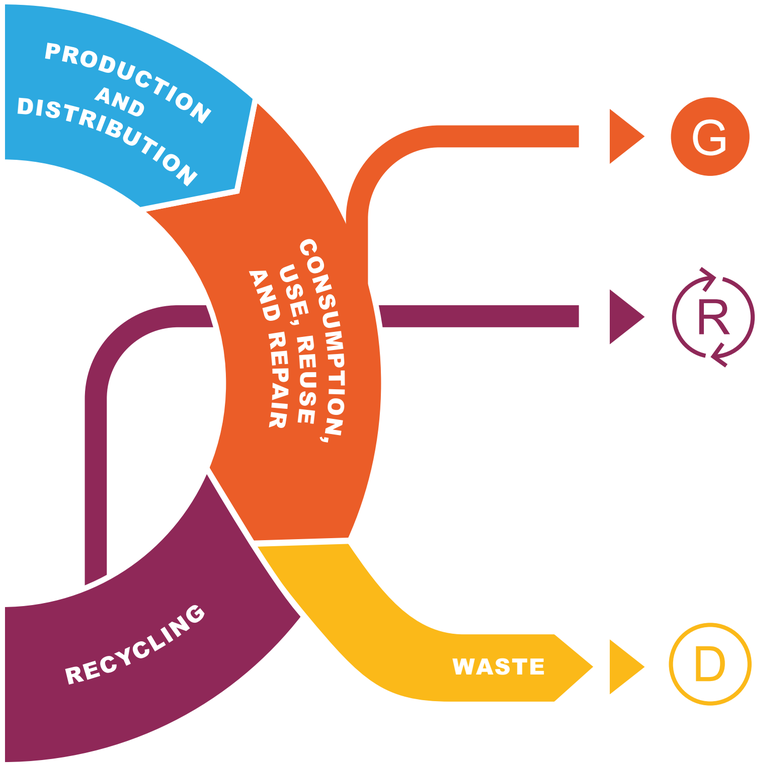
- New York has detailed statewide data that enables planning and is likely to have contributed to the state's relatively strong recycling performance. However, more recent data and a statewide waste characterization study could provide further insight to allow for more comprehensive waste and recycling planning across the state.

NORTH CAROLINA

KEY FACTS

POPULATION	**10,488,084**
PERCENT URBAN	**66.1%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**44%**
CCPM GENERATION RANK	**18**
CCPM RECYCLING RANK	**18**
CCPM RECYCLING RANK without Cardboard	**26**
CCPM DISPOSAL RANK	**13**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.75 million tons
338 lbs. per capita

PACKAGING RECYCLED
0.92 million tons
177 lbs. per capita

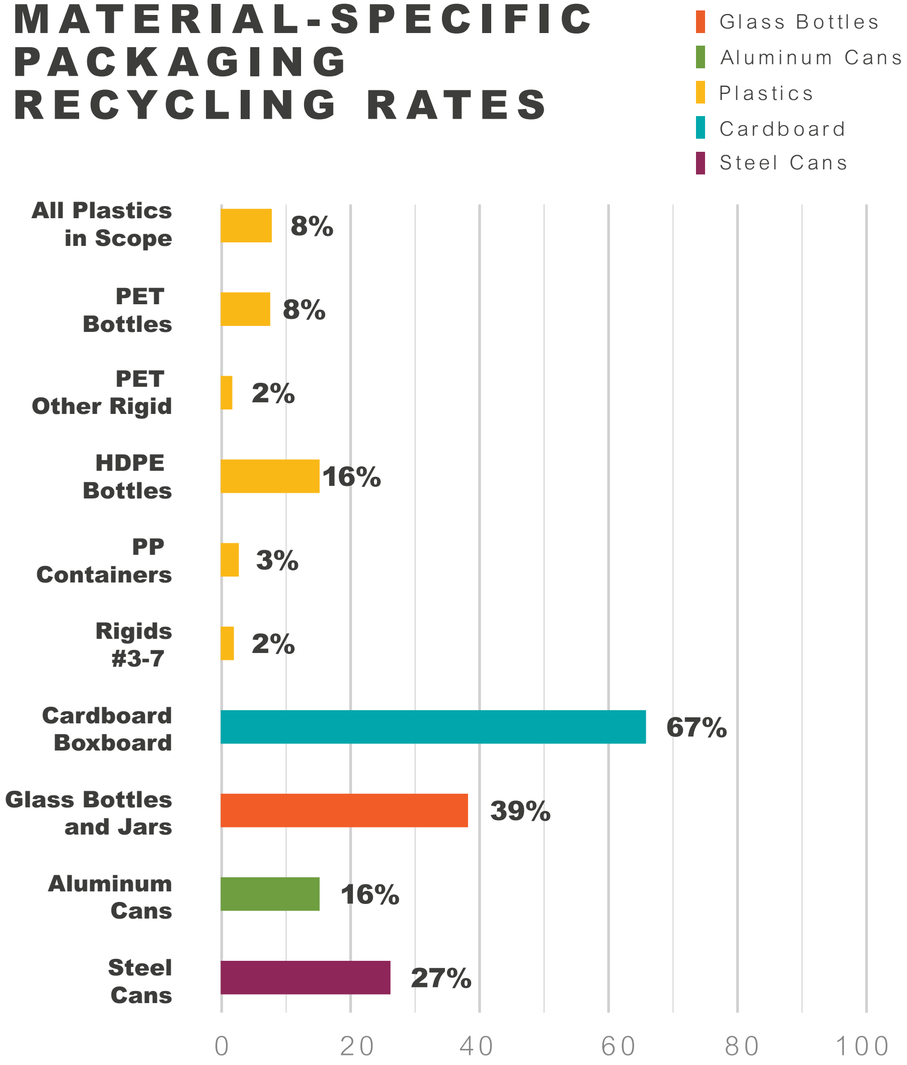
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.84 million tons
161 lbs. per capita

NORTH CAROLINA

OVERVIEW

The North Carolina Department of Environmental Quality's (NCDEQ) Waste Management Division helps to ensure the proper management of solid waste through the implementation of solid waste programs and the provision of technical assistance. In fiscal year 2016-2017, North Carolina's recycling system achieved a low overall recovery rate of 14.9%.[156] The 2014-2024 Solid Waste Management Plan is in the process of being updated. [157]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NORTH CAROLINA

DATA

Each North Carolina county and municipality is required to complete an annual report on their solid waste and recycling activities. NCDEQ produces annual Solid Waste Management Reports detailing the state's total disposed MSW tonnages. The amount of material recovered by local governments (e.g., diverted from disposal to economic use) is recorded on an annual basis for high level material categories; the most recent publication contains recovery data for fiscal year 2018-2019.[158] There is no indication as to what fraction of the recovered material is recycled.

KEY TAKEAWAYS

Recycling

- North Carolina's CCPM recycling rate is ~44%, which is among the top 20 highest rates in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~23%, highlighting the impact of the large proportion of cardboard and boxboard.
- North Carolina's recycling rate, with and without cardboard and boxboard, is the highest in the southern region, although its average landfill fee is slightly higher than average, and the proportion of residents with curbside access is ~69%, which is lower than some other Southern states.

Generation and Disposal

- North Carolina generates ~338 lbs./capita/year of CCPM, which is less than 60% of other US states.
- With its relatively high recycling rate, this leads to a disposal rate of ~161 lbs./capita/year. On a per capita basis, this places North Carolina among the 20 states that send the least amount of material to landfill or incineration. If comparing to other states in the Southern region, North Carolina sends the least amount of material to disposal.

Data

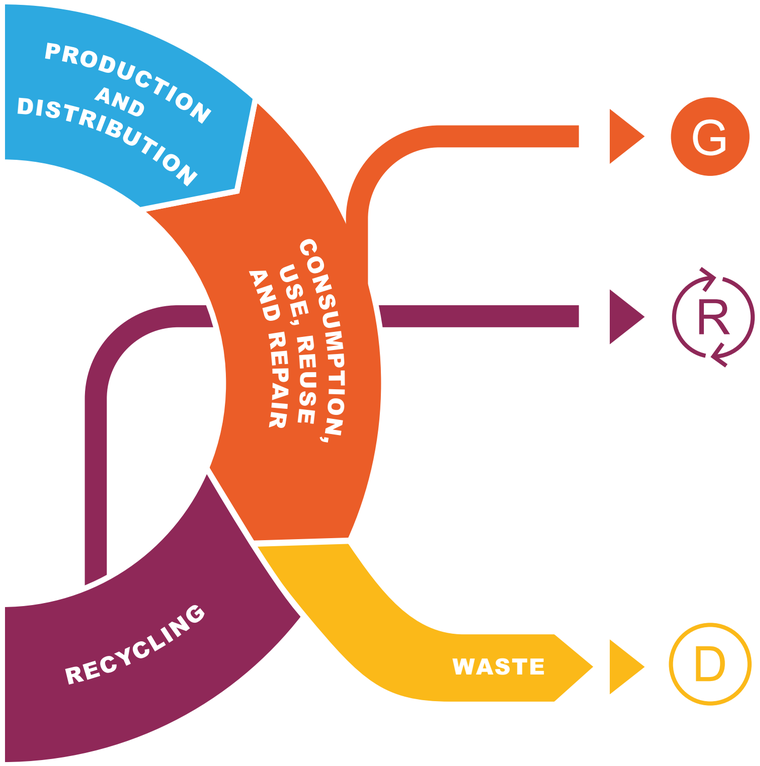
- North Carolina's annual reporting requirements provide some insight into solid waste and recycling activities that likely contribute to high recycling performance. A more recent statewide waste characterization study would provide more accurate information on the composition of waste and recycling in the state.

NORTH DAKOTA

KEY FACTS

POPULATION	**762,062**
PERCENT URBAN	**59.9%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**8**
PERFORMANCE	
CCPM RECYCLING RATE	**33%**
CCPM GENERATION RANK	**46**
CCPM RECYCLING RANK	**35**
CCPM RECYCLING RANK without Cardboard	**23**
CCPM DISPOSAL RANK	**45**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.15 million tons
386 lbs. per capita

PACKAGING RECYCLED
0.05 million tons
136 lbs. per capita

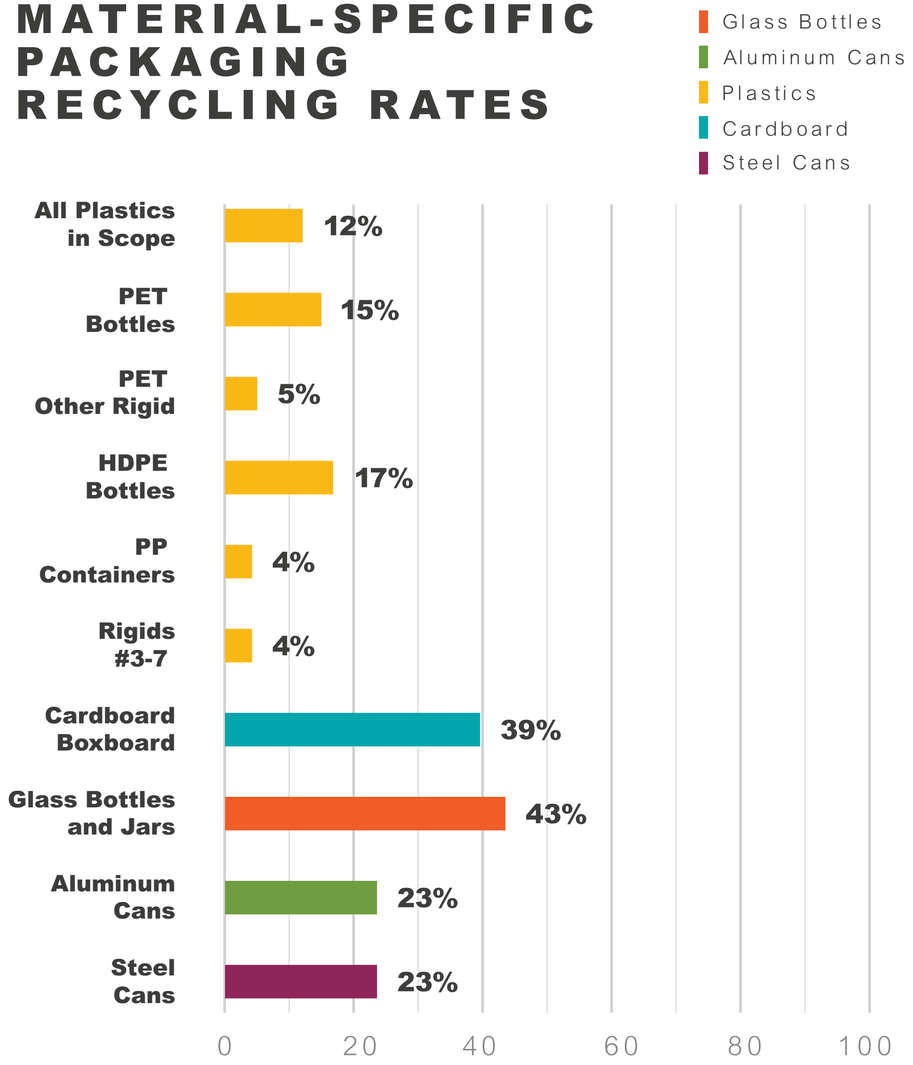
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.09 million tons
250 lbs. per capita

NORTH DAKOTA

OVERVIEW

The North Dakota Department of Environmental Quality's (DEQ) Division of Waste Management enforces state and federal waste management law in North Dakota.[159] There is no overarching legislation in the state regarding post-consumer packaging recycling.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



NORTH DAKOTA

DATA

North Dakota does not have strict enforcement policies regarding the reporting of recycling activity in the state.[160]

KEY TAKEAWAYS

Recycling

- North Dakota's CCPM recycling rate is ~33%, which is the 35th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~29%. This is the 23ird highest in the country.

Generation and Disposal

- North Dakota generates ~386 lbs./capita/year of CCPM, which is one of the top 10 highest per capita generation rates in the US.
- With its recycling rate of ~33%, this leads to ~250 lbs./capita/year of CCPM material disposed. This puts North Dakota among the top 10 states with the highest per capita disposal.

Data

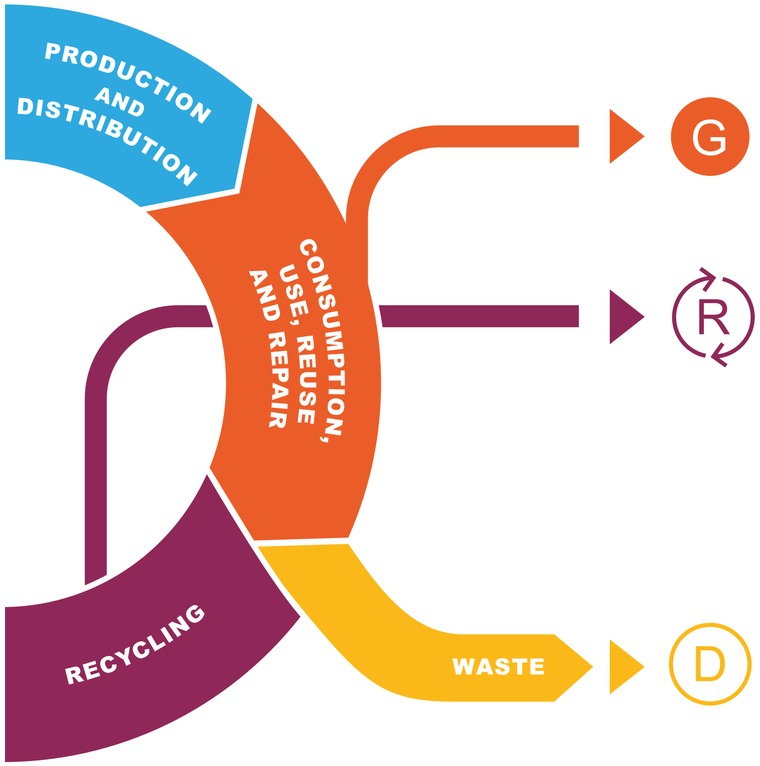
- North Dakota's lack of recent and useable data is likely to lead to an inability to set recycling strategies in the state. The state should consider undertaking a statewide waste characterization study and implementing mandatory data reporting requirements and data collection systems for municipalities and waste and recycling facilities.

OHIO

KEY FACTS

POPULATION	**11,689,100**
PERCENT URBAN	**77.9%**
CENSUS SUB-REGION	**Midwest**
EPA REGION	**5**
PERFORMANCE	
CCPM RECYCLING RATE	**27%**
CCPM GENERATION RANK	**2**
CCPM RECYCLING RANK	**44**
CCPM RECYCLING RANK without Cardboard	**29**
CCPM DISPOSAL RANK	**20**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.55 million tons
265 lbs. per capita

PACKAGING RECYCLED
0.42 million tons
72 lbs. per capita

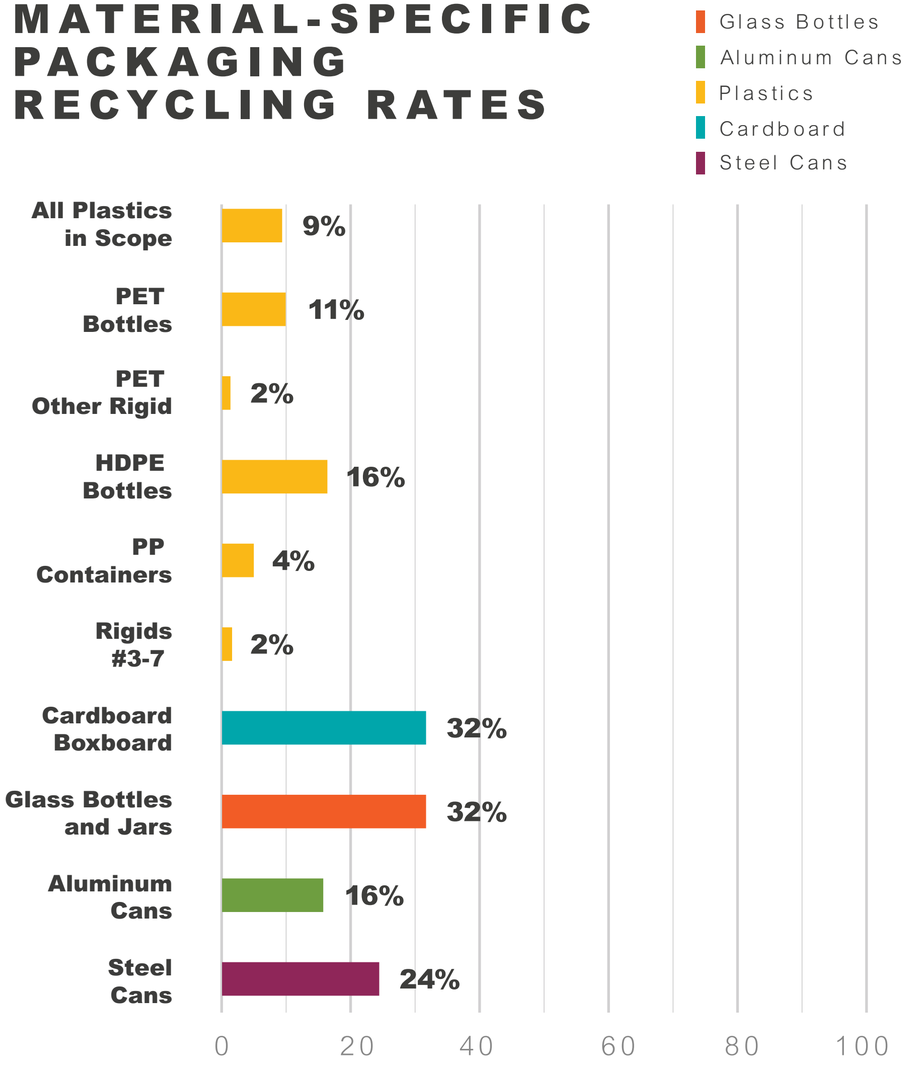
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
1.13 million tons
193 lbs. per capita

OHIO

OVERVIEW

The Ohio Environmental Protection Agency (EPA) and the individual Solid Waste Management Districts (SWMD) within Ohio are responsible for implementing statewide waste reduction and recycling programs.[161] Each SWMD must report high level total tons disposed and recycled annually to the Ohio EPA in the form of an Annual District Report (ADR) as specified in Goal #6 of the 1995 State Solid Waste Management Plan.[162]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



OHIO

DATA

Through the 1995 State Solid Waste Management Plan, Ohio mandates that each SWMD produce an Annual District Report (ADR), which reports the total tons recycled by commercial, residential, and industrial sectors.[163] Disposed tons are also reported for the state, however only with a total tonnage figure and not broken down by material type.

KEY TAKEAWAYS

Recycling

- Ohio's CCPM recycling rate is ~27%, which is the 44th highest in the country and lowest among the Midwest states.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~19%. This is the 29th highest rate in the US.

Generation and Disposal

- Ohio generates ~265 lbs./capita/year of CCPM, making it one of the 10 states with the lowest per capita generation.
- With its recycling rate of ~27%, this leads to ~193 lbs./capita/year disposed. This puts Ohio below the average for per capita disposal across the US.

Data

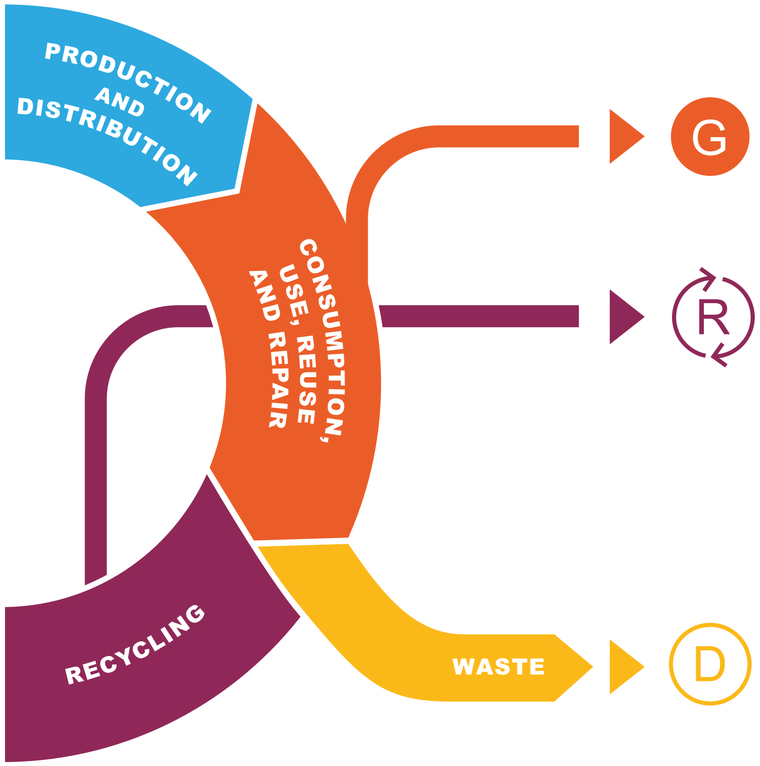
- Ohio has a comprehensive data system but could consider undertaking a statewide MSW characterization study to better understand waste composition in the state.

OKLAHOMA

KEY FACTS

POPULATION	**3,956,971**
PERCENT URBAN	**66.2%**
CENSUS SUB-REGION	**West South Central**
EPA REGION	**6**
PERFORMANCE	
CCPM RECYCLING RATE	**29%**
CCPM GENERATION RANK	**15**
CCPM RECYCLING RANK	**41**
CCPM RECYCLING RANK without Cardboard	**44**
CCPM DISPOSAL RANK	**39**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.66 million tons
335 lbs. per capita

PACKAGING RECYCLED
0.21 million tons
105 lbs. per capita

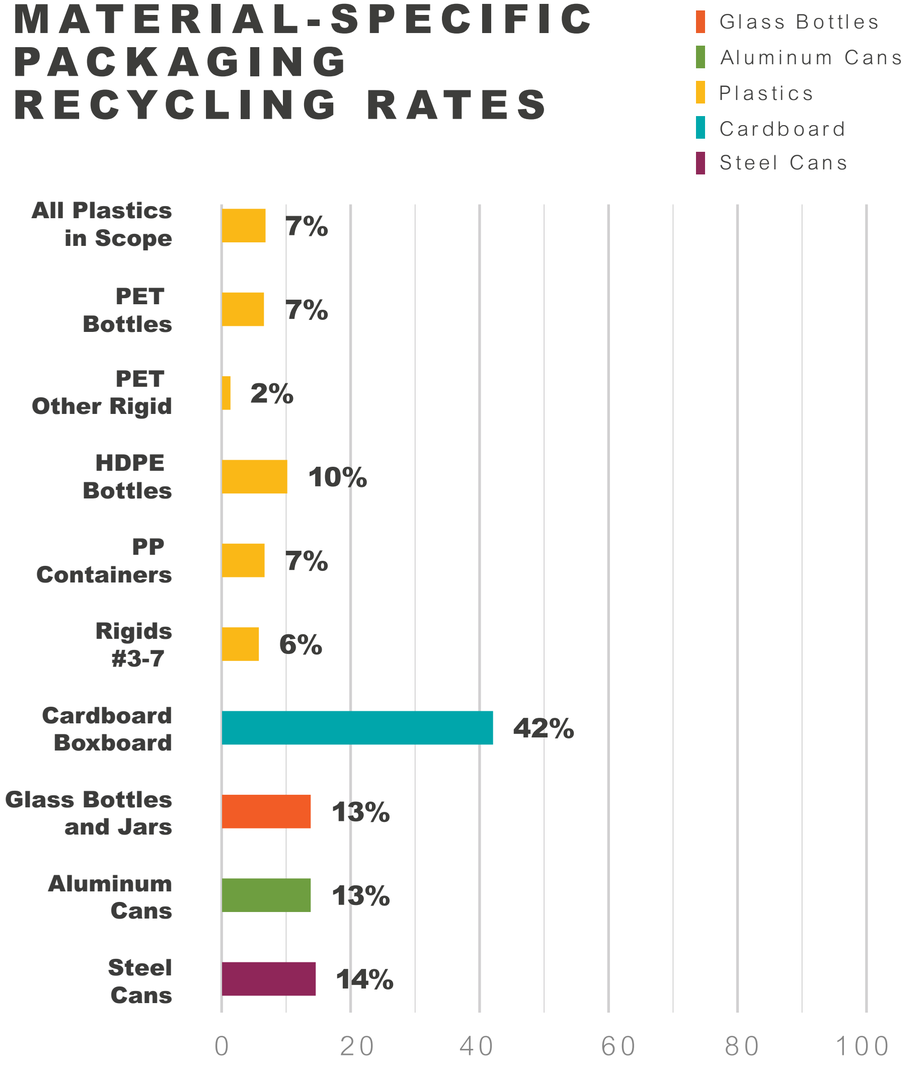
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.45 million tons
230 lbs. per capita

OKLAHOMA

OVERVIEW

The Oklahoma Department of Environmental Quality's (ODEQ) Land Protection Division has two primary functions in waste management: solid waste permitting and solid waste compliance. ODEQ also maintains databases of recyclers in Oklahoma and market prices for recyclables.[164]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



OKLAHOMA

DATA

The ODEQ does not regularly publish data on the weight or composition of materials recycled in Oklahoma. Oklahoma's Office of Management and Enterprise Services (OMES) produced a report in 2016 detailing the tonnages of materials recycled by public entities who were subject to the Oklahoma State Recycling and Recycled Materials Procurement Act. [165] Although it is suggested this is an annual report, the most recent publication found was released in 2016. Regarding disposed waste, the ODEQ publishes annual figures on the tonnage of MSW landfilled, however, no disposed waste characterization studies are available.[166]

KEY TAKEAWAYS

Recycling

- Oklahoma's CCPM recycling rate is ~29%, which is among the 10 lowest performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~10%.
- Oklahoma's CCPM recycling rate, with and without cardboard and boxboard, is below average for the Southern states.

Generation and Disposal

- Oklahoma generates ~335 lbs./capita/year of CCPM, which is less than 60% of other states in the nation.
- Oklahoma's below average recycling rate leads to a disposal rate of ~230 lbs./capita/year, which is among the 20 worst performing states in the nation and near the average for the southern states.
- The average landfill fee for Oklahoma is below average for the southern states.

Data

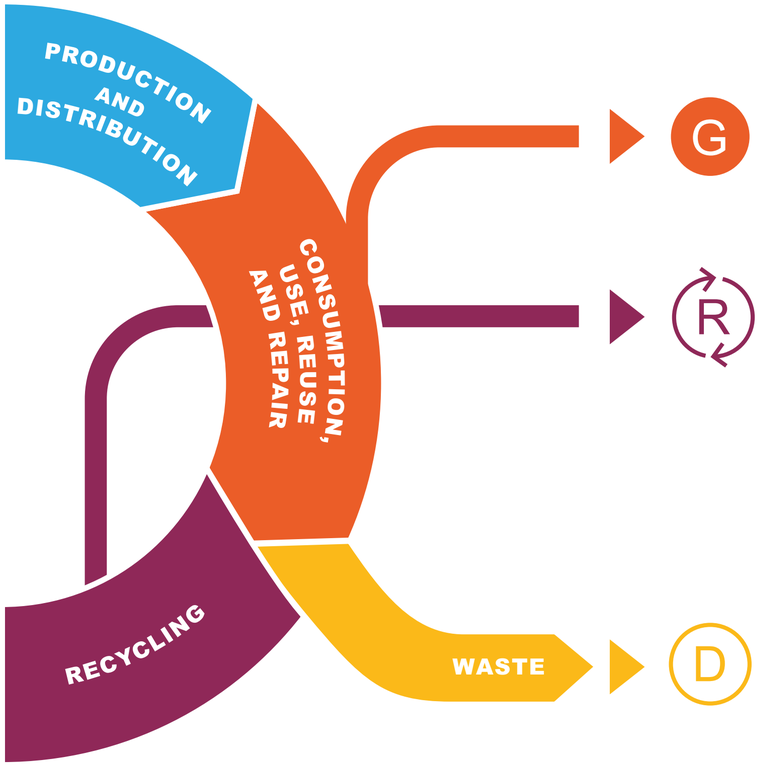
- Oklahoma should consider undertaking a statewide waste characterization study to better understand waste composition in the state. It should also consider expanding and mandating data reporting systems for municipalities and waste and recycling facilities beyond public entities to provide a comprehensive picture of recycling and waste disposal in the state.

OREGON

KEY FACTS

POPULATION	**4,217,737**
PERCENT URBAN	**81%**
CENSUS SUB-REGION	**Pacific**
EPA REGION	**10**
PERFORMANCE	
CCPM RECYCLING RATE	**66%**
CCPM GENERATION RANK	**22**
CCPM RECYCLING RANK	**2**
CCPM RECYCLING RANK without Cardboard	**4**
CCPM DISPOSAL RANK	**3**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.72 million tons
341 lbs. per capita

PACKAGING RECYCLED
0.48 million tons
230 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.23 million tons
111 lbs. per capita

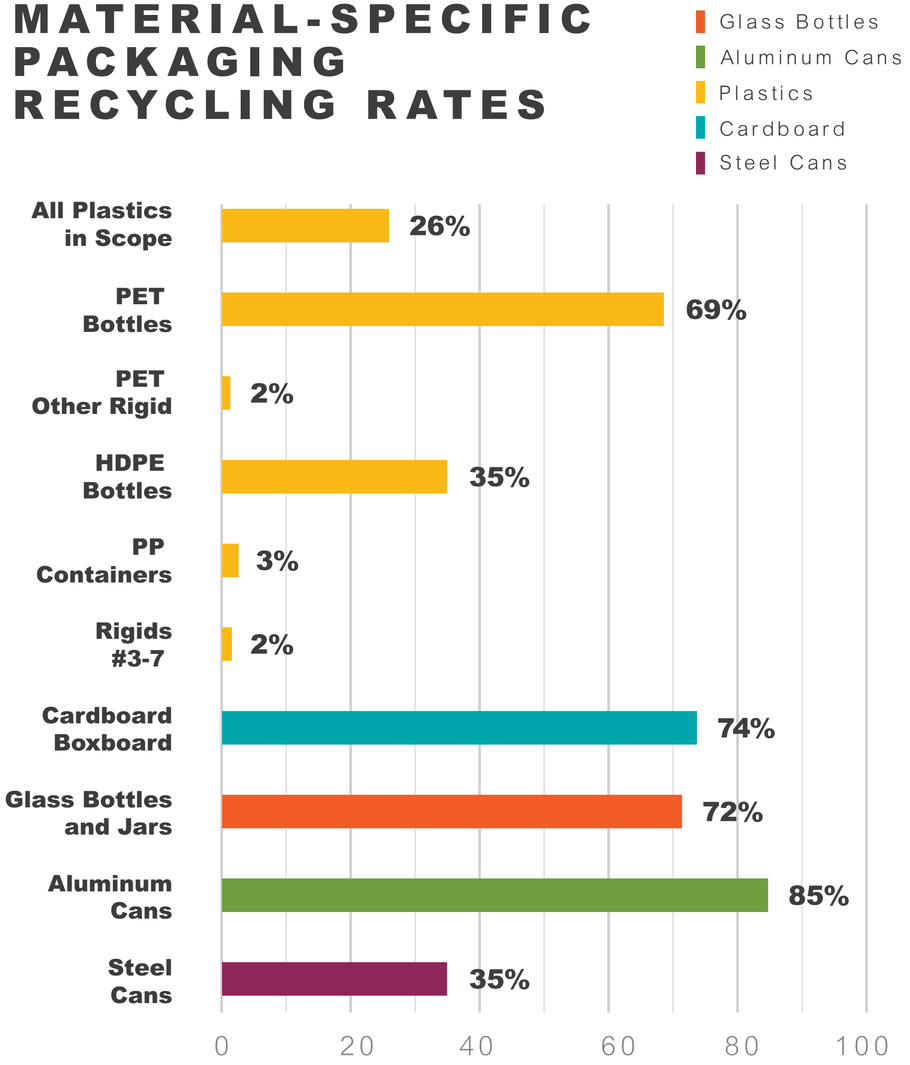
OREGON

OVERVIEW

Under Oregon law, all cities with at least 4,000 people must provide recycling services. It is up to local governments to plan and implement their own recycling plans. In 2011, Oregon shifted to a materials management focus drafting a 2050 vision on waste diversion and setting recycling targets in the interim. Oregon has set a 2020 recycling rate target of 52% for the general solid waste stream.[167]

In addition to mandating recycling in certain cities, Oregon has one of the nation's oldest bottle bills, which was implemented in 1972, the first in the US. It is noteworthy that the state recently increased the level of the deposit on beverage containers from $0.05 to $0.10, pushing redemption rates of in-scope containers to near 90%, one of the top two in the US, along with Michigan, which also has a $0.10 deposit.[168] Oregon's Department of Environmental Quality (DEQ) also monitors its recovered tons and surveys all facilities annually on material processed as well as contamination, community education and other measures.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



OREGON

DATA

In 1991, the Oregon Legislature mandated that the state track and report on state and local recovery rates. The Oregon Department of Environmental Quality (DEQ) has a Materials Management Program, which records an annual Oregon Material Recovery Survey where in the DEQ collects data from industry, collection service providers, local governments, and landfill administrators to obtain a complete dataset of yearly recovery.[169] The DEQ also conducts a statewide waste characterization study once every two years. [170]

KEY TAKEAWAYS

Recycling

- Oregon's CCPM recycling rate is ~66%, which is the second highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~55%. This is the fourth highest in the country.
- ~57% of the recycled rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are collected via the state's DRS.
- Oregon has high recycling rates for materials included in its DRS, including ~61% for PET bottles, ~70% for glass bottles and jars, and ~88% for aluminum cans. These rates represent the highest of any material in any state, including cardboard and boxboard.

Generation and Disposal

- Oregon generates ~341 lbs./capita/year of CCPM. This is near the median across the states, but the high recycling rate means that ~111 lbs./capita/year are disposed, which is the third lowest disposal rate in the nation.
- The average landfill fee for Oregon is higher than the national average and that of the Western states, but lower than its neighbor, Washington.

Data

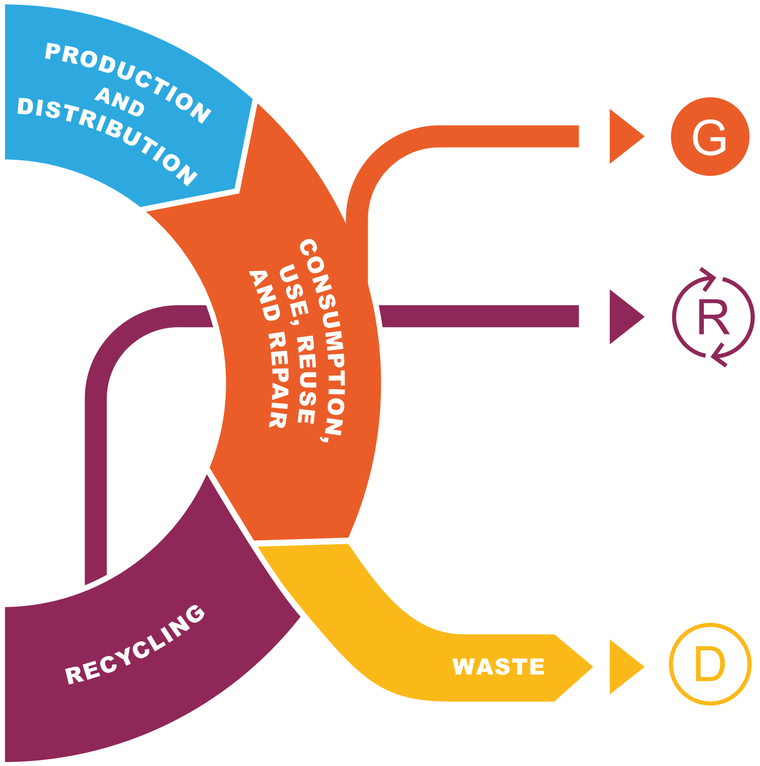
- Oregon has been tracking material recovery rates for three decades and undertakes a statewide waste characterization study every two years. These measures have generated a plethora of data that enables better planning and is likely to have contributed to Oregon's being one of the highest performance states for CCPM recycling.

PENNSYLVANIA

KEY FACTS

POPULATION	**12,801,989**
PERCENT URBAN	**78.7%**
CENSUS SUB-REGION	**Northeast**
EPA REGION	**3**
PERFORMANCE	
CCPM RECYCLING RATE	**60%**
CCPM GENERATION RANK	**38**
CCPM RECYCLING RANK	**8**
CCPM RECYCLING RANK without Cardboard	**18**
CCPM DISPOSAL RANK	**10**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
2.34 million tons
365 lbs. per capita

PACKAGING RECYCLED
1.47 million tons
229 lbs. per capita

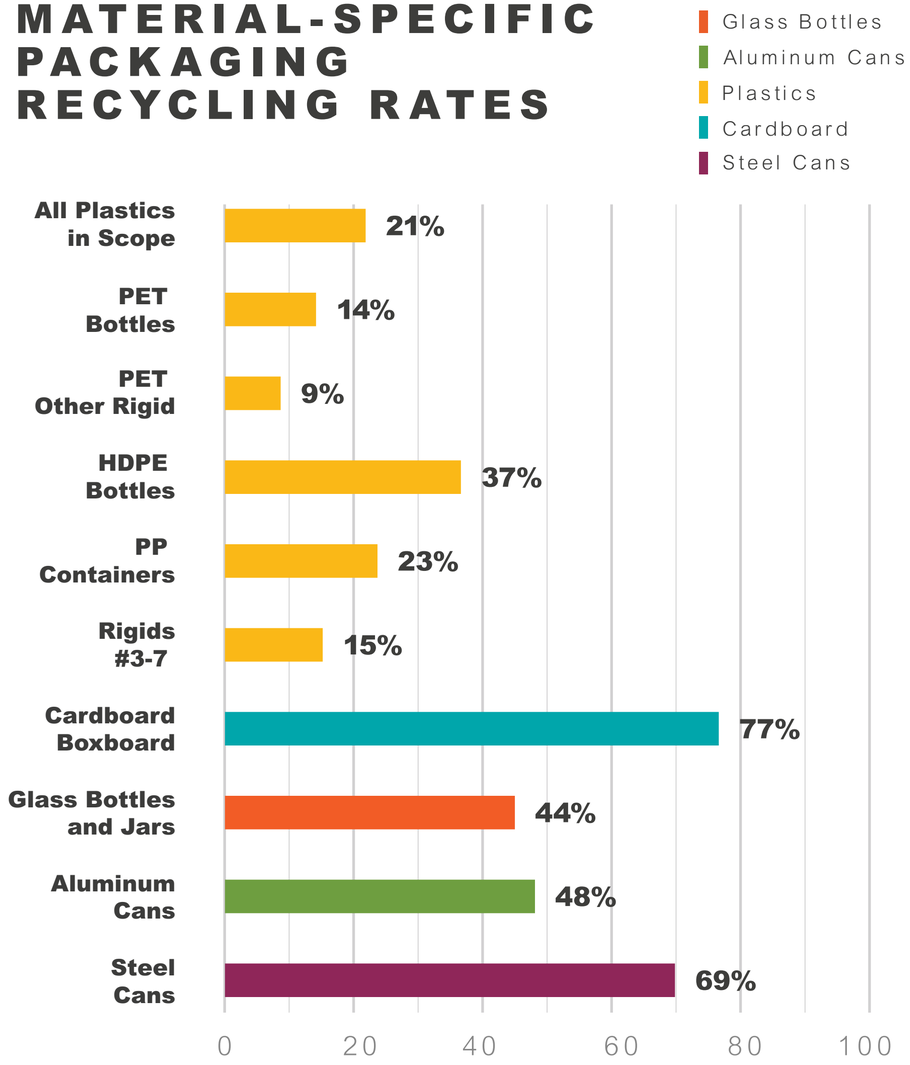
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.87 million tons
136 lbs. per capita

PENNSYLVANIA

OVERVIEW

Municipalities and counties in Pennsylvania report annual tons recycled (for both the residential and commercial sectors) to the Pennsylvania Department of Environmental Protection (DEP).[171] Currently, 94% of the state has access to recycling services via curbside or drop-off, while 79% of the population has curbside access.[172] Pennsylvania Act 101 mandates that all municipalities develop a solid waste management plan.[173]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



PENNSYLVANIA

DATA

Counties report annual tons recycled to the Pennsylvania DEP. Tons are categorized by how they are collected (e.g., single stream, or specific recycling such as “glass” recycling).[174]

KEY TAKEAWAYS

Recycling

- Pennsylvania’s CCPM recycling rate is ~60%, which is the eighth highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~36%. This is the 18th highest rate in the US.
- ~14% of PET bottles, ~37% of HDPE bottles, ~44% of glass bottles and jars, and ~48% of aluminum cans are recycled, which is below average for the northeastern states. ~77% of cardboard and boxboard are recycled, which is above average for the Northeastern region.

Generation and Disposal

- Pennsylvania generates ~365 lbs./capita/year of CCPM, making it one of the top 20 highest per capita generation states.
- With a recycling rate of ~60%, this leads to ~136 lbs./capita/year disposed. On a per capita basis, Pennsylvania disposes less CCPM than 80% of other states in the country. The average landfill tip fee is below average compared to other states in the Northeast region.

Data

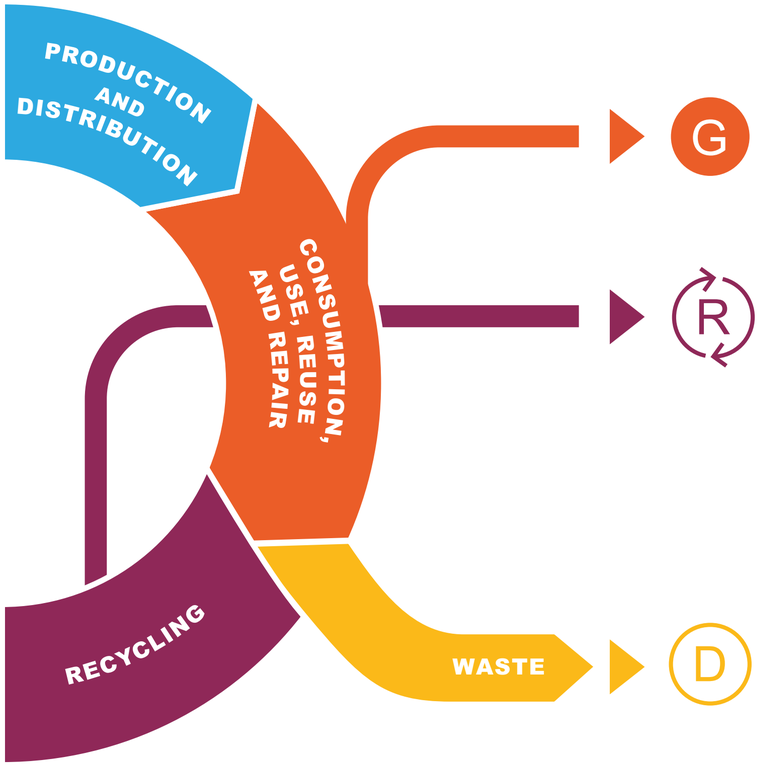
- Annual reporting in Pennsylvania provides some insight into tonnages and material splits of recycling that likely contribute to high recycling performance. However, a more recent statewide waste characterization study would provide more accurate information on the current composition of waste and recycling in the state.

RHODE ISLAND

KEY FACTS

POPULATION	**1,059,361**
PERCENT URBAN	**90.7%**
CENSUS SUB-REGION	**New England**
EPA REGION	**3**
PERFORMANCE	
CCPM RECYCLING RATE	**56%**
CCPM GENERATION RANK	**9**
CCPM RECYCLING RANK	**12**
CCPM RECYCLING RANK without Cardboard	**16**
CCPM DISPOSAL RANK	**9**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.17 million tons
318 lbs. per capita

PACKAGING RECYCLED
0.10 million tons
186 lbs. per capita

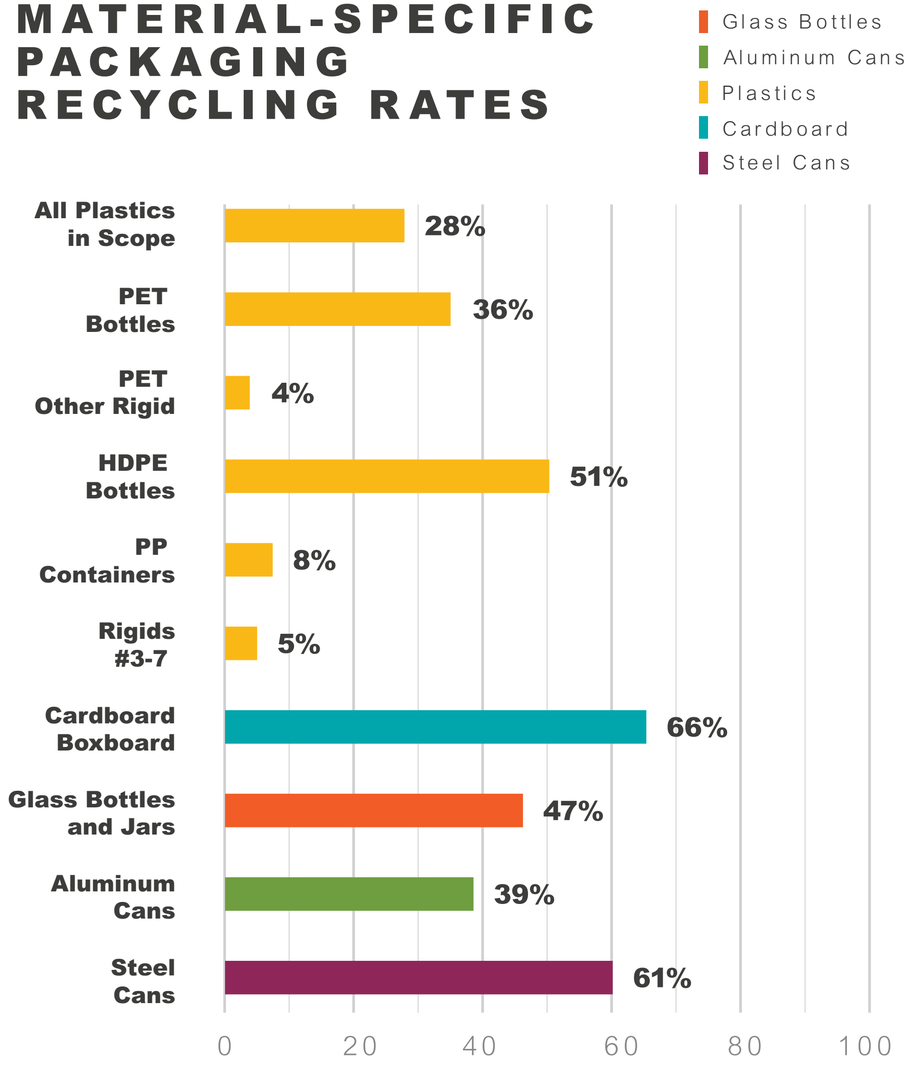
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.07 million tons
132 lbs. per capita

RHODE ISLAND

OVERVIEW

Rhode Island has a very progressive set of legislation mandating both recycling targets and consumer access to recycling. The Rhode Island Resource Recovery Corporation (RIRRC) works in conjunction with state government entities to oversee solid waste management.[175] The state has set a target to recycle no less than 35% of the solid waste generated in the state. Additionally, there is a requirement that all solid waste generated from residential and commercial establishments to be separated into recyclable and nonrecyclable components.[176]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



RHODE ISLAND

DATA

Transfer stations and other recycling facilities are required to submit annual tonnage flows to the Rhode Island Department of Environmental Management. The tons are categorized by stream and destination. Therefore, Rhode Island has a high-quality set of recycling data to track performance over time. Rhode Island also requires landfills to report on their activity annually, providing the state with the data necessary to track its diversion rate each year. [177] [178]

KEY TAKEAWAYS

Recycling

- Rhode Island's CCPM recycling rate is ~56%, which is the 12th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastic packaging, glass bottles and jars, and steel and aluminum cans is ~39%. This is the 16th highest rate in the US.

Generation and Disposal

- Rhode Island generates ~318 lbs./capita/year of CCPM, making it one of the 10 states with the lowest per capita generation.
- With a recycling rate of ~56%, this leads to ~132 lbs./capita/year disposed. On a per capita basis, Rhode Island disposes less CCPM than 80% of other states in the country.

Data

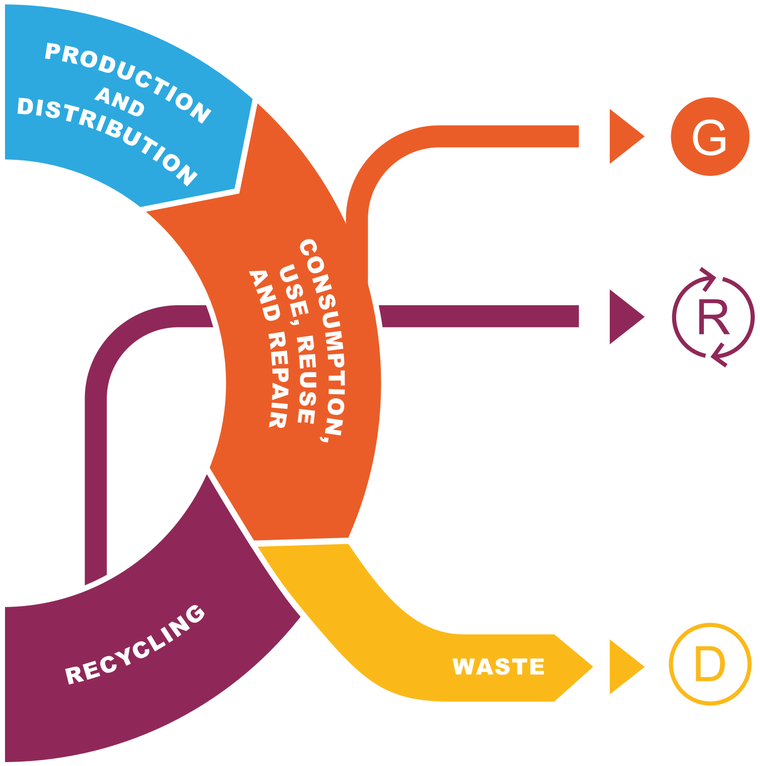
- As a result of annual reporting requirements, Rhode Island has a high-quality set of recycling data with which to track performance over time. Access to data both on recycling and disposal enables better planning and is likely to have contributed to Rhode Island being a high performing state in terms of recycling.

SOUTH CAROLINA

KEY FACTS

POPULATION	**5,148,714**
PERCENT URBAN	**66.3%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**34%**
CCPM GENERATION RANK	**26**
CCPM RECYCLING RANK	**32**
CCPM RECYCLING RANK without Cardboard	**46**
CCPM DISPOSAL RANK	**33**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.88 million tons
347 lbs. per capita

PACKAGING RECYCLED
0.33 million tons
129 lbs. per capita

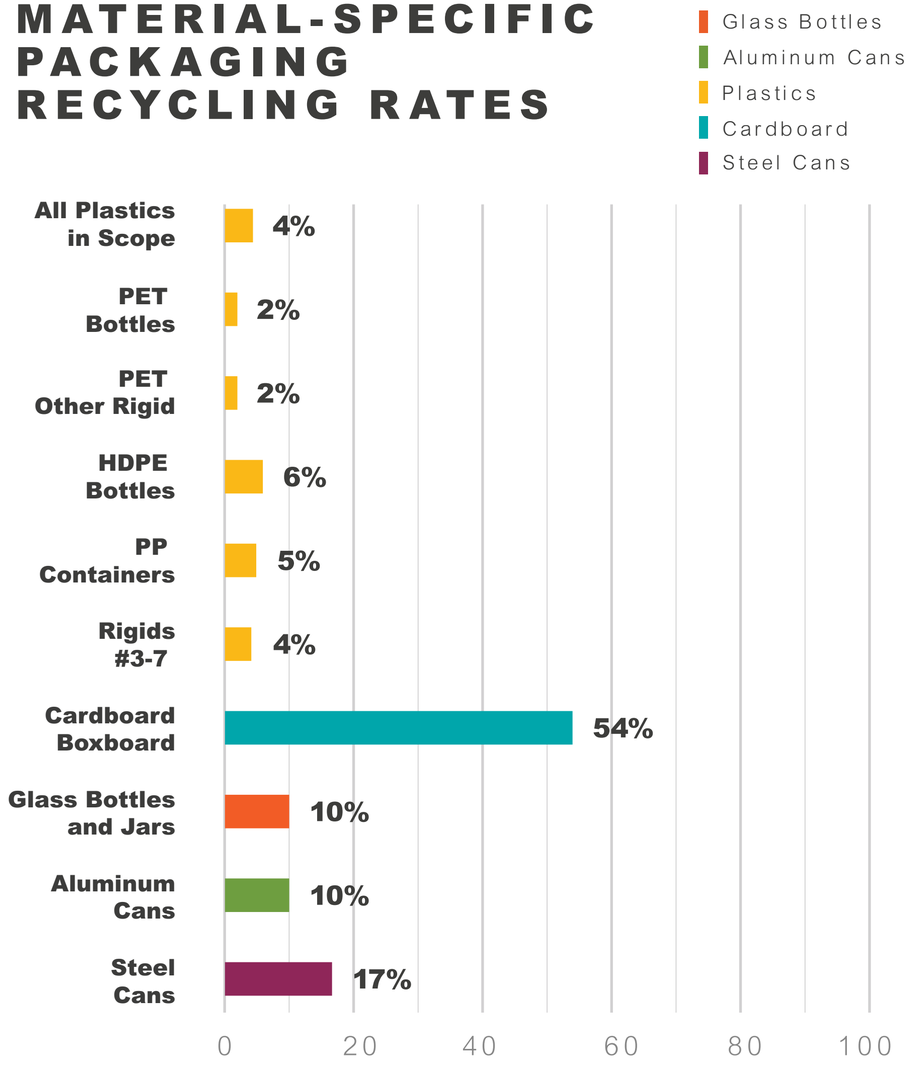
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.55 million tons
217 lbs. per capita

SOUTH CAROLINA

OVERVIEW

The South Carolina Department of Health and Environmental Control's (DHEC) Office of Solid Waste Reduction and Recycling is required by the S.C. Solid Waste Policy and Management Act of 1991 to produce annual reports.[179] The state's current goals are to recycle at least 40% of its MSW and to reduce MSW disposal to 3.25 lbs./person/day. [180]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



SOUTH CAROLINA

DATA

The quality of recycling data in South Carolina is good, which can be attributed to the state's mandatory reporting requirements. The most recent publication (2019) includes the amount of material recycled by commodity and county, the amount of MSW disposed by county, and the state's progress toward meeting its waste reduction and recycling goals.[181] There is no statewide waste characterization study, however, Horry County, which accounts for approximately 7% of South Carolina's population, commissioned a study that was published in 2019.[182]

KEY TAKEAWAYS

Recycling

- South Carolina's CCPM recycling rate is ~34%, which is lower than the national average.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~8%, highlighting the impact of cardboard and boxboard and its relatively high recycling rate in the state.
- South Carolina's recycling rate is slightly high for the southern region, but without cardboard and boxboard is among the lowest in the South and the nation.

Generation and Disposal

- South Carolina generates ~347 lbs./capita/year of CCPM, which is near the median rate for the nation.
- South Carolina disposes of ~217 lbs./capita/year of these materials, which places it among the 20 states that send the most material to landfill or incineration.
- The average landfill fee for South Carolina is around average for the Southern states.

Data

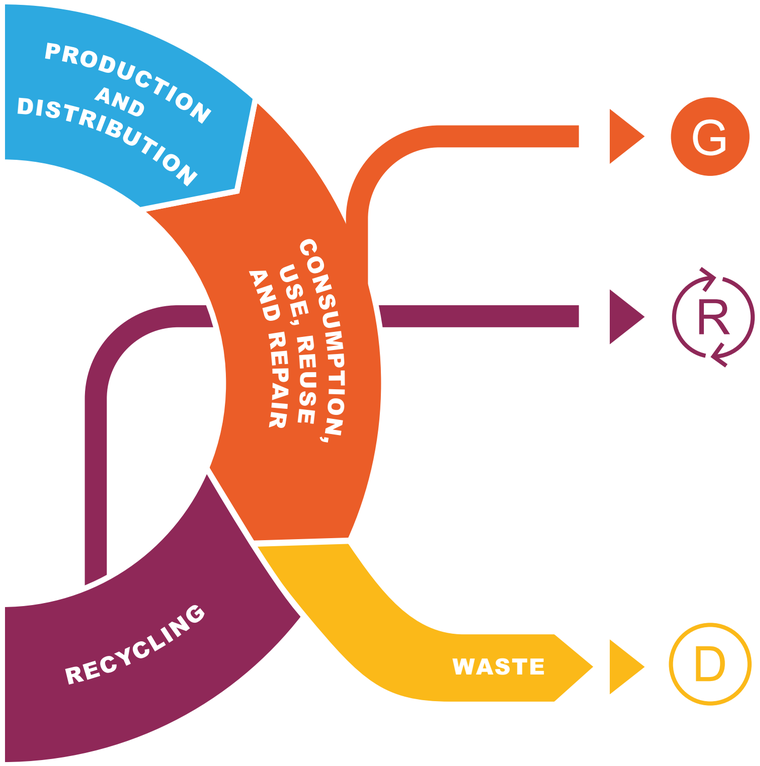
- South Carolina's mandatory reporting requirements provide recent data that can inform decision-making and help the state meet its waste reduction and recycling goals. Still, South Carolina should consider undertaking a statewide waste characterization study to better understand waste and recycling composition to better address low-performing materials.

SOUTH DAKOTA

KEY FACTS

POPULATION	**884,659**
PERCENT URBAN	**56.7%**
CENSUS SUB-REGION	**West North Central**
EPA REGION	**8**
PERFORMANCE	
CCPM RECYCLING RATE	**36%**
CCPM GENERATION RANK	**35**
CCPM RECYCLING RANK	**28**
CCPM RECYCLING RANK without Cardboard	**20**
CCPM DISPOSAL RANK	**35**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.16 million tons
363 lbs. per capita

PACKAGING RECYCLED
0.06 million tons
140 lbs. per capita

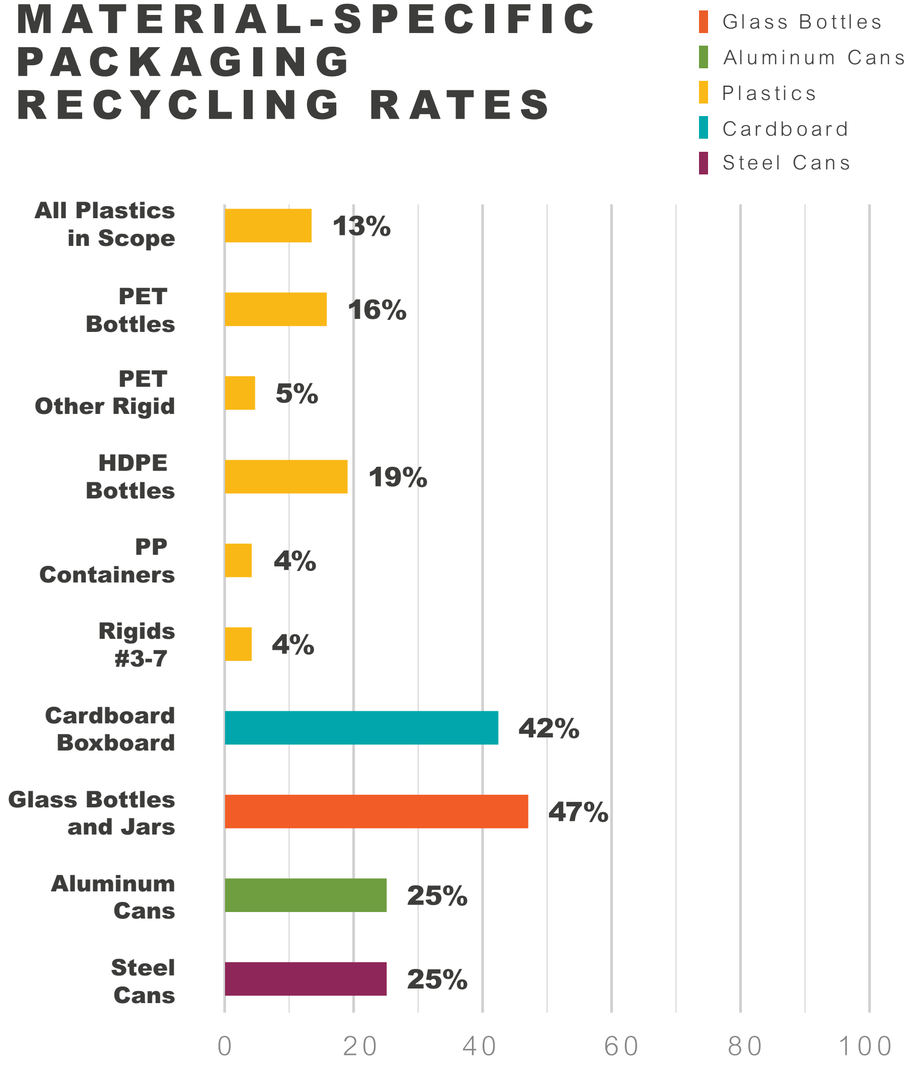
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.10 million tons
223 lbs. per capita

SOUTH DAKOTA

OVERVIEW

The South Dakota Department of Environment and Natural Resources (DENR) is responsible for overseeing waste management in the state.[183] There is no overarching legislation in the state regarding post-consumer recycling.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



SOUTH DAKOTA

DATA

The DENR does not track waste or recycling composition, recycling tonnage, litter tonnage or litter composition. In 2011, the state produced a "State of South Dakota Recycling/Diversion Report," but no recent data has been published,[184] and no recent data from other sources has been found.

KEY TAKEAWAYS

Recycling

- South Dakota's CCPM recycling rate is ~36%, which is the 29th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~32%. This is the 20th highest in the country.

Generation and Disposal

- South Dakota generates ~363 lbs./capita/year of CCPM, making it one of the top 20 states for highest per capita generation.
- With its recycling rate of ~36%, this leads to a disposal rate of ~223 lbs./capita/year. On a per capita basis, this places South Dakota among the top 20 states that dispose the least amount of CCPM material per year.

Data

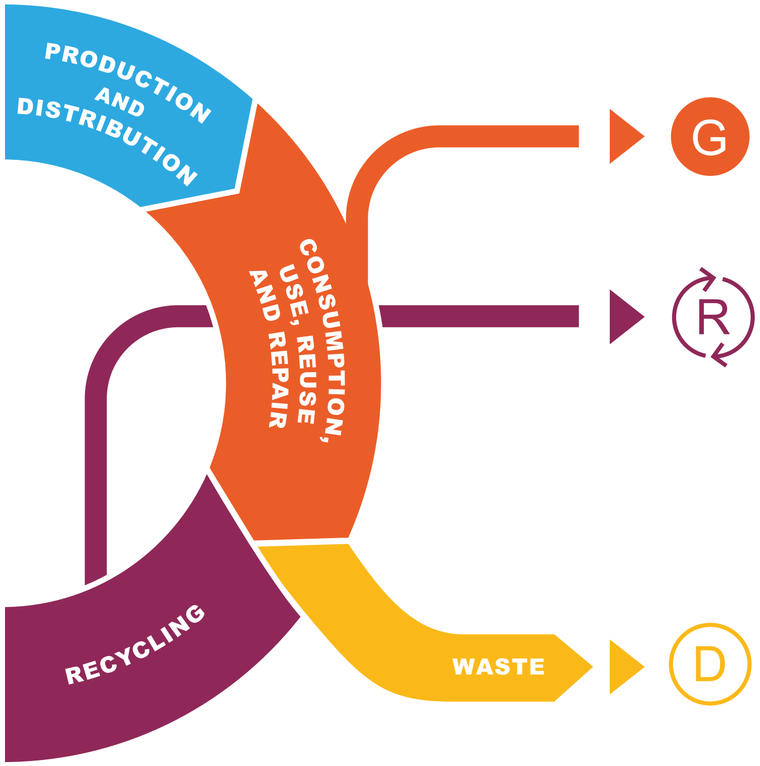
- South Dakota's lack of recent data is likely to lead to an inability to set recycling strategies in the state. The state should consider undertaking a statewide waste characterization study and implementing data collection and reporting systems across the state.

TENNESSEE

KEY FACTS

POPULATION	**6,829,174**
PERCENT URBAN	**66.4%**
CENSUS SUB-REGION	**East South Central**
EPA REGION	**4**
PERFORMANCE	
CCPM RECYCLING RATE	**22%**
CCPM GENERATION RANK	**31**
CCPM RECYCLING RANK	**48**
CCPM RECYCLING RANK without Cardboard	**47**
CCPM DISPOSAL RANK	**49**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.20 million tons
355 lbs. per capita

PACKAGING RECYCLED
0.28 million tons
82 lbs. per capita

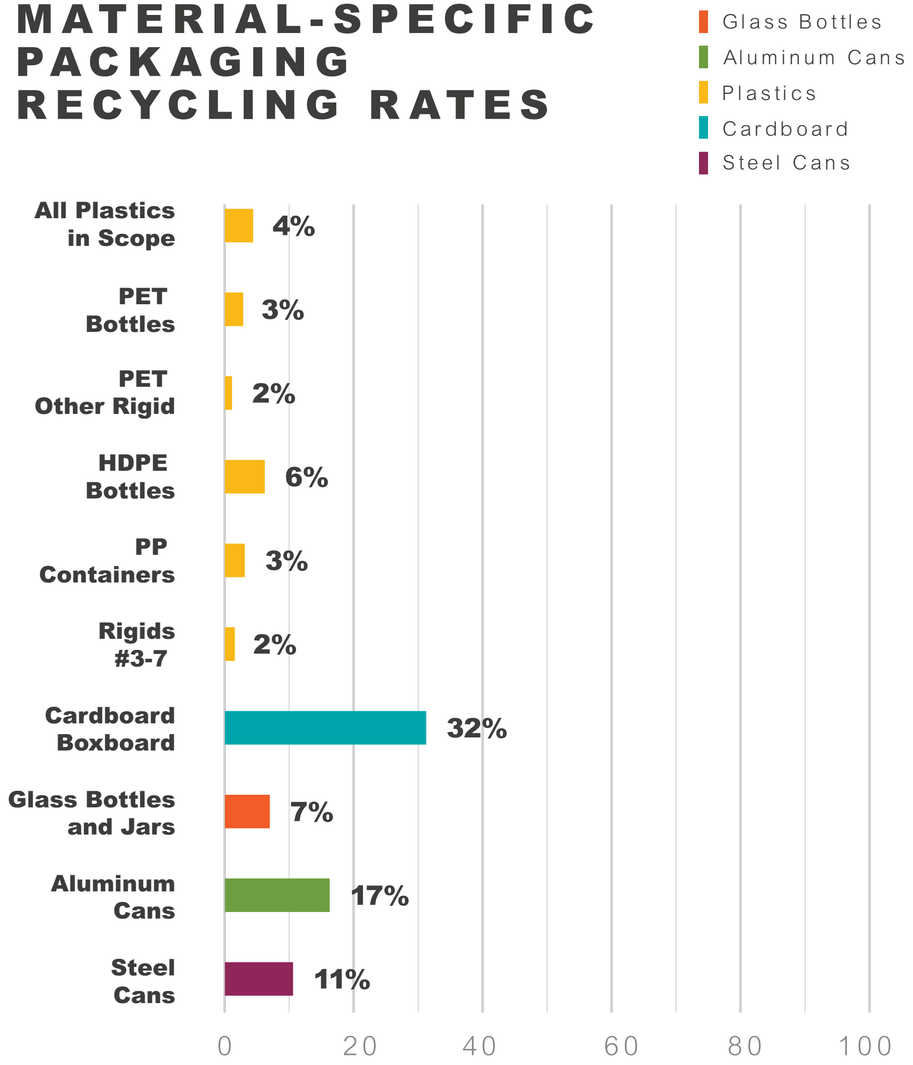
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.92 million tons
273 lbs. per capita

TENNESSEE

OVERVIEW

Tennessee's Division of Solid Waste Management (DSWM) has oversight of waste management activities in Tennessee. The Solid Waste Program, operating under the authority of the Solid Waste Management Act of 1991, ensures safe and sanitary processing and disposal of solid waste in the state.[185] DSWM's objectives, described in the 2021-2025 Solid Waste and Materials Management Plan, include establishing more robust waste management goals and improving the accuracy of measurement while increasing access to and participation in recycling.[186] A preemptive bill, House Bill 1021, was passed in 2019, prohibiting local government from banning or regulating certain auxiliary containers.[187]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



TENNESSEE

DATA

In 2020, the DSWM published an annual report [188] that provides statewide data on the tonnages of post-consumer recycling in 2018/19, by high level material category. While there are no recycling composition studies available, regions are required to file an annual performance review containing data on recycling – this includes an analysis of the waste stream in terms of types and quantity of materials generated. [189] The most recent waste characterization study was published in 2008.[190]

KEY TAKEAWAYS

Recycling

- Tennessee's CCPM recycling rate is ~22%, which is among the 10 lowest performing states in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~7%, which is below average for the Southern states.
- Tennessee's recycling rates with and without cardboard and boxboard are among the lowest in the nation.

Generation and Disposal

- Tennessee generates ~355 lbs./capita/year of CCPM, which is higher than the national average.
- Tennessee's high generation and low recycling rate lead to a high disposal rate of ~273 lbs./capita/year, which places it among the 10 states that send the most material to landfill.
- The average landfill fee for Tennessee is below the national average.

Data

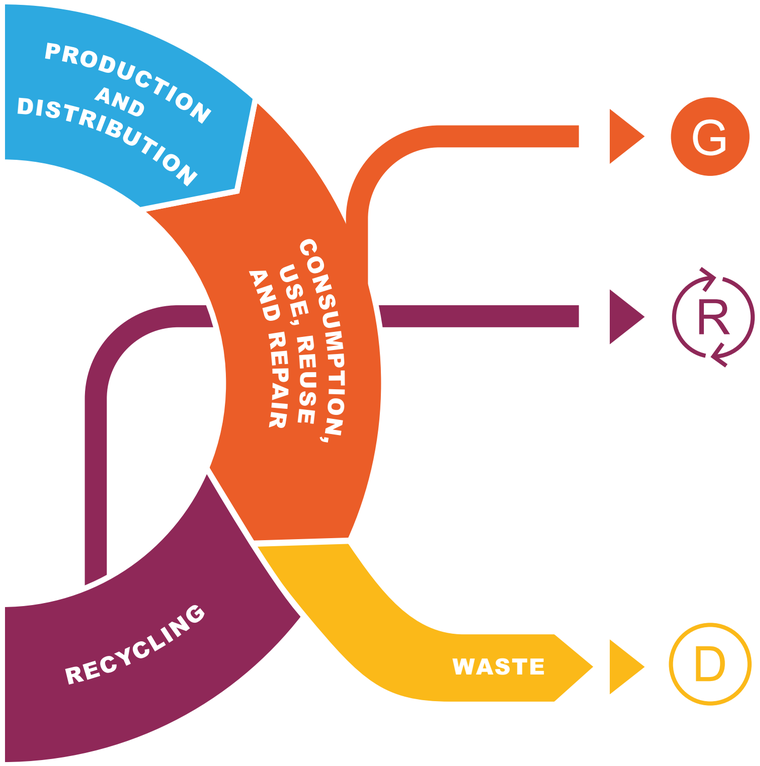
- Tennessee has good systems for collecting and recording data on waste generation and recycling from across the state but should consider undertaking a statewide waste characterization study to better understand waste and recycling composition. Such data could inform policy and programming decision to better address low-performing materials.

TEXAS

KEY FACTS

POPULATION	**28,995,881**
PERCENT URBAN	**85%**
CENSUS SUB-REGION	**West South Central**
EPA REGION	**6**
PERFORMANCE	
CCPM RECYCLING RATE	**32%**
CCPM GENERATION RANK	**6**
CCPM RECYCLING RANK	**39**
CCPM RECYCLING RANK without Cardboard	**42**
CCPM DISPOSAL RANK	**29**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
4.40 million tons
307 lbs. per capita

PACKAGING RECYCLED
1.38 million tons
96 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
3.02 million tons
211 lbs. per capita

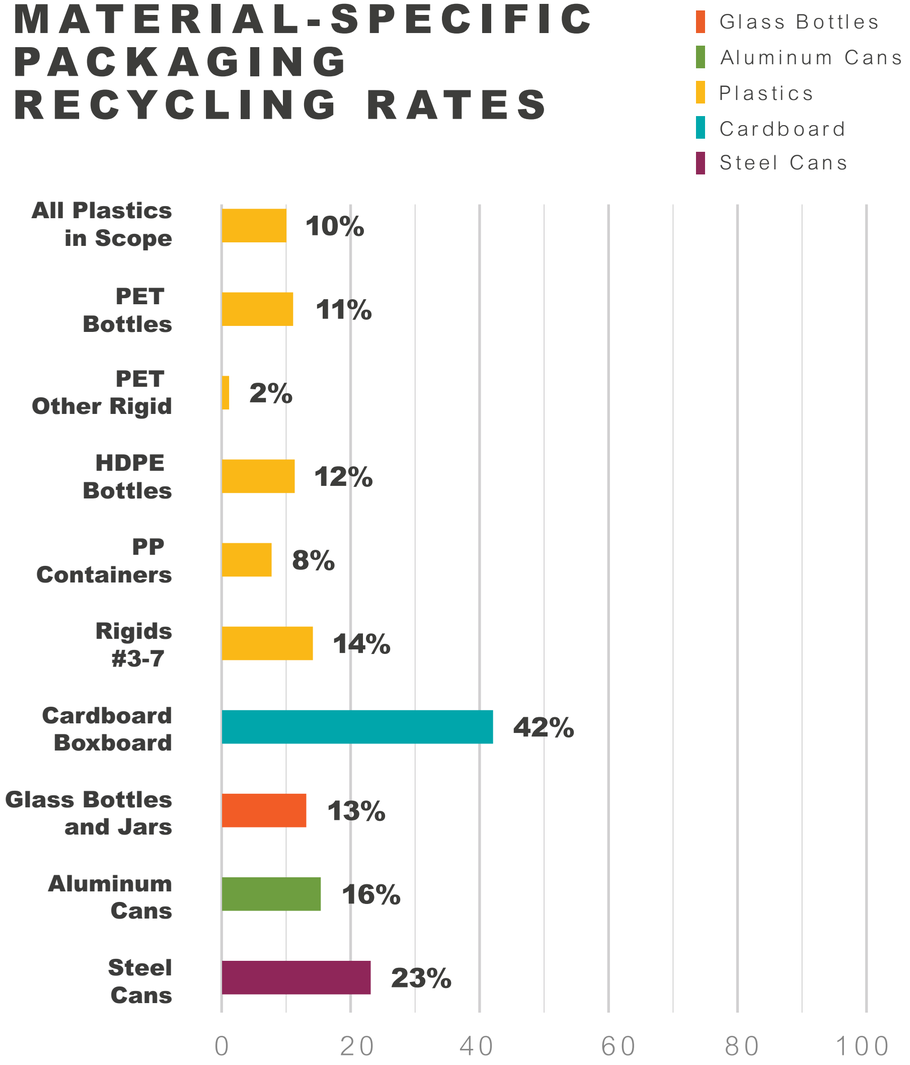
TEXAS

OVERVIEW

The Texas Commission on Environmental Quality (TCEQ) has oversight of solid waste management in Texas and is responsible for compliance and enforcement. Owners and operators of recycling facilities that have not been granted an exemption from reporting (due to size or other factors) must keep records of the amounts of material recycled or transferred and make them available upon request to the TCEQ. Recycling infrastructure in Texas is good; most recyclables generated within Texas' borders are shipped to facilities within the state.[191]

A Texas Supreme Court decision in 2018, NO.16-0748, effectively acts as a preemptive law and prevents municipalities from prohibiting the sale or use of a container package in a manner not authorized by state law.[192]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



TEXAS

DATA

The TCEQ does not publish regular data regarding the tonnage of recycled material in the state and there has been no recycling stream composition study. However, a report released in 2016 [193] for the TCEQ provides estimates on the recycled tonnages by high level material category for the calendar year 2015. These estimations were based on data collected through a study survey in addition to supplemental data.

Regarding disposed waste, the TCEQ published a report in 2019 detailing disposed MSW tonnage for calendar year 2018.[194] This includes some tonnage data for materials diverted from landfill at high level material categories. There has been no recent statewide disposed waste characterization study, although some major cities in Texas, such as Austin, have commissioned studies in the past.

KEY TAKEAWAYS

Recycling

- Texas' CCPM recycling rate is ~32%, which is lower than the national average.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~13%.
- Texas' recycling rates with and without cardboard and boxboard are approximately average for the Southern states.

Generation and Disposal

- Texas generates ~307 lbs./capita/year of CCPM, which places it among the 10 states that generate the least amount of material.
- Although Texas' CCPM generation rate is low, it is relatively low recycling rate means that it still sends ~211 lbs./capita/year of these materials disposal, which is around the median for states across the country.
- The average landfill fee for Texas is slightly less than the average for the Southern states.

Data

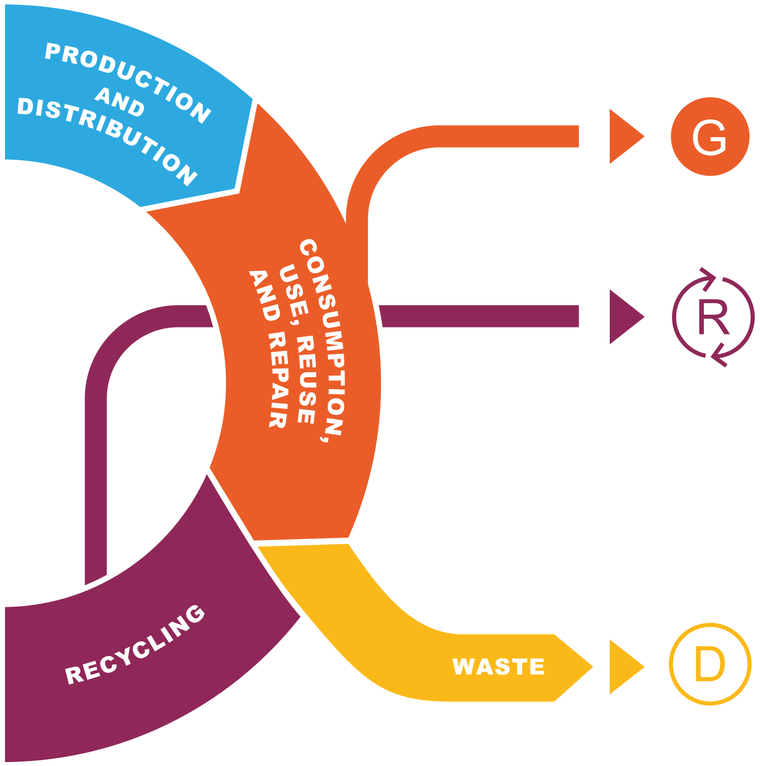
- The TCEQ should consider undertaking a statewide waste characterization study to better understand waste composition in the state and publish regular data regarding the tonnage of recycled material. Texas should also consider implementing data collection and reporting requirements for all municipalities and waste and recycling facilities to obtain accurate and comprehensive insight into recycling in the state.

UTAH

KEY FACTS

POPULATION	**3,205,958**
PERCENT URBAN	**91%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**8**
PERFORMANCE	
CCPM RECYCLING RATE	**37%**
CCPM GENERATION RANK	**27**
CCPM RECYCLING RANK	**26**
CCPM RECYCLING RANK without Cardboard	**31**
CCPM DISPOSAL RANK	**24**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.55 million tons
347 lbs. per capita

PACKAGING RECYCLED
0.22 million tons
143 lbs. per capita

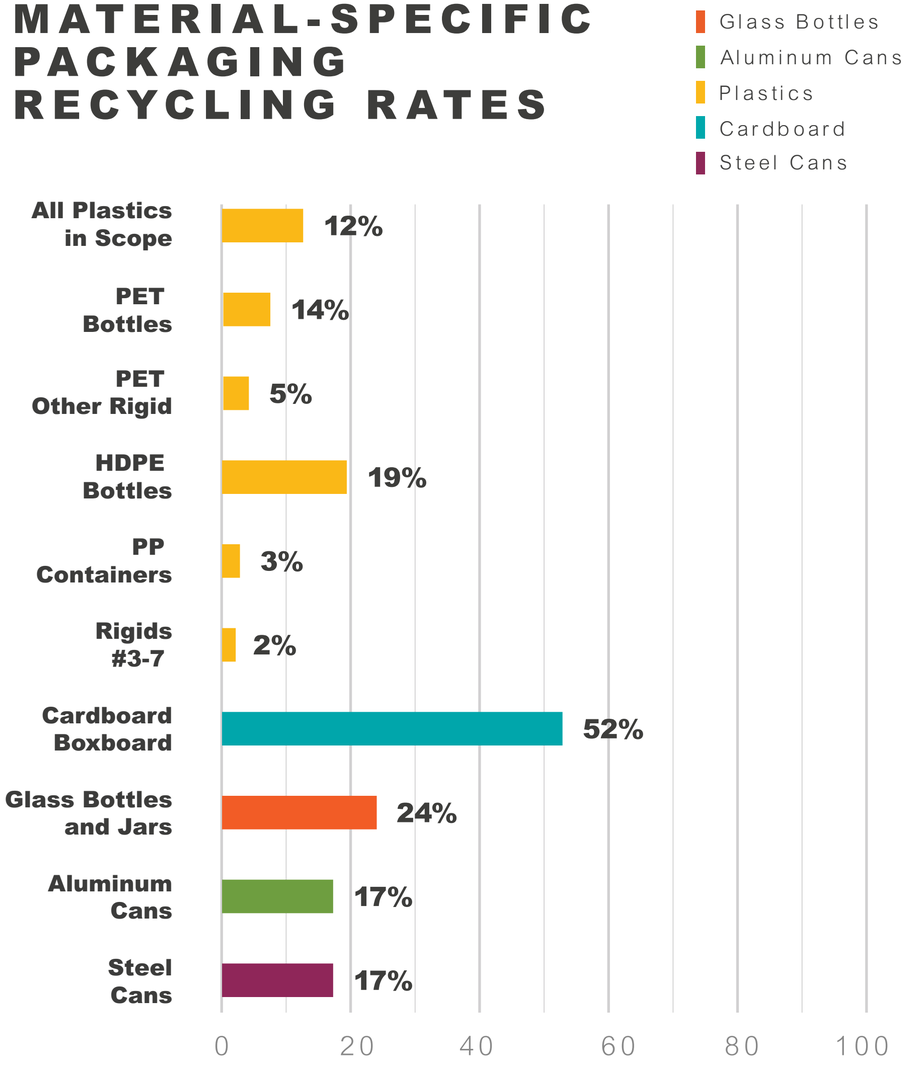
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.32 million tons
205 lbs. per capita

UTAH

OVERVIEW

There is very little information on recycling in Utah or its overall solid waste landscape. Regulations are set at a county level. Recycling facilities are required to report annual tons to the Department of Environmental Quality (DEQ). The data on reported tons is limited in their granularity and the source and composition of such material is unable to be determined. [195]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



UTAH

DATA

Data availability in Utah is very limited. Reported tons recycled or disposed are only available at a total aggregate level for all sectors.

KEY TAKEAWAYS

Recycling

- Utah's CCPM recycling rate is ~37%, which is around the median for the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~17%, indicating the impact of cardboard and boxboard.
- Utah's CCPM recycling rates, with and without cardboard and boxboard, are both near the average for the western states.

Generation and Disposal

- Utah generates ~347 lbs./capita/year of CCPM, which is around the median for the nation.
- Utah's average recycling rate leads to a disposal rate of ~205lbs/capita/year, which is also around the median for the US.
- The average landfill fee for Utah is the lowest of the western states and is unlikely to incentivize increased waste diversion.

Data

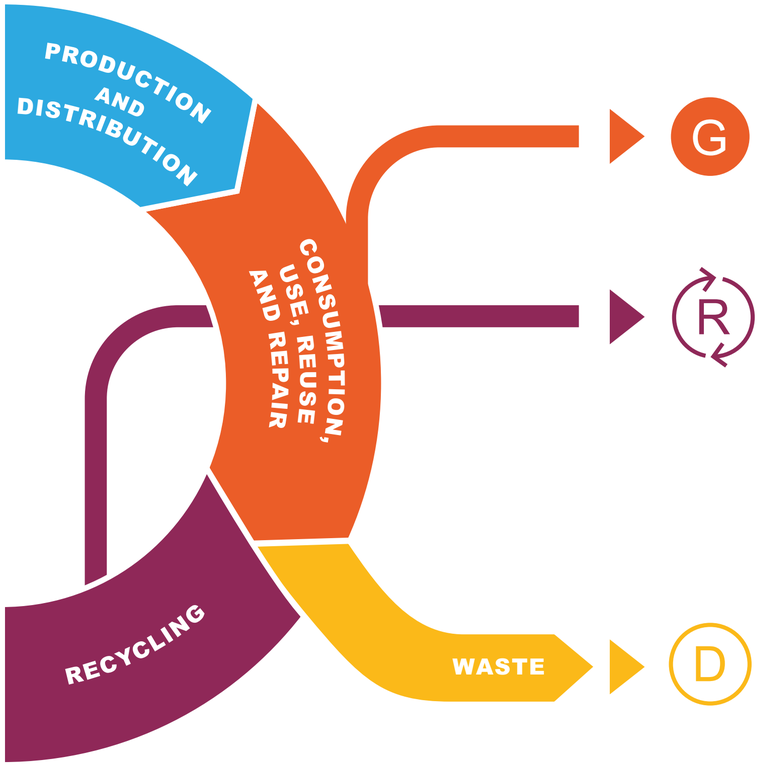
- Utah's data is very limited. The state should consider undertaking a statewide waste characterization study to better understand waste composition in the state and consider implementing data reporting requirements for waste and recycling facilities.

VERMONT

KEY FACTS

POPULATION	**623,989**
PERCENT URBAN	**38.9%**
CENSUS SUB-REGION	**New England**
EPA REGION	**1**
PERFORMANCE	
CCPM RECYCLING RATE	**62%**
CCPM GENERATION RANK	**8**
CCPM RECYCLING RANK	**4**
CCPM RECYCLING RANK without Cardboard	**2**
CCPM DISPOSAL RANK	**4**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.10 million tons
317 lbs. per capita

PACKAGING RECYCLED
0.06 million tons
201 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.04 million tons
116 lbs. per capita

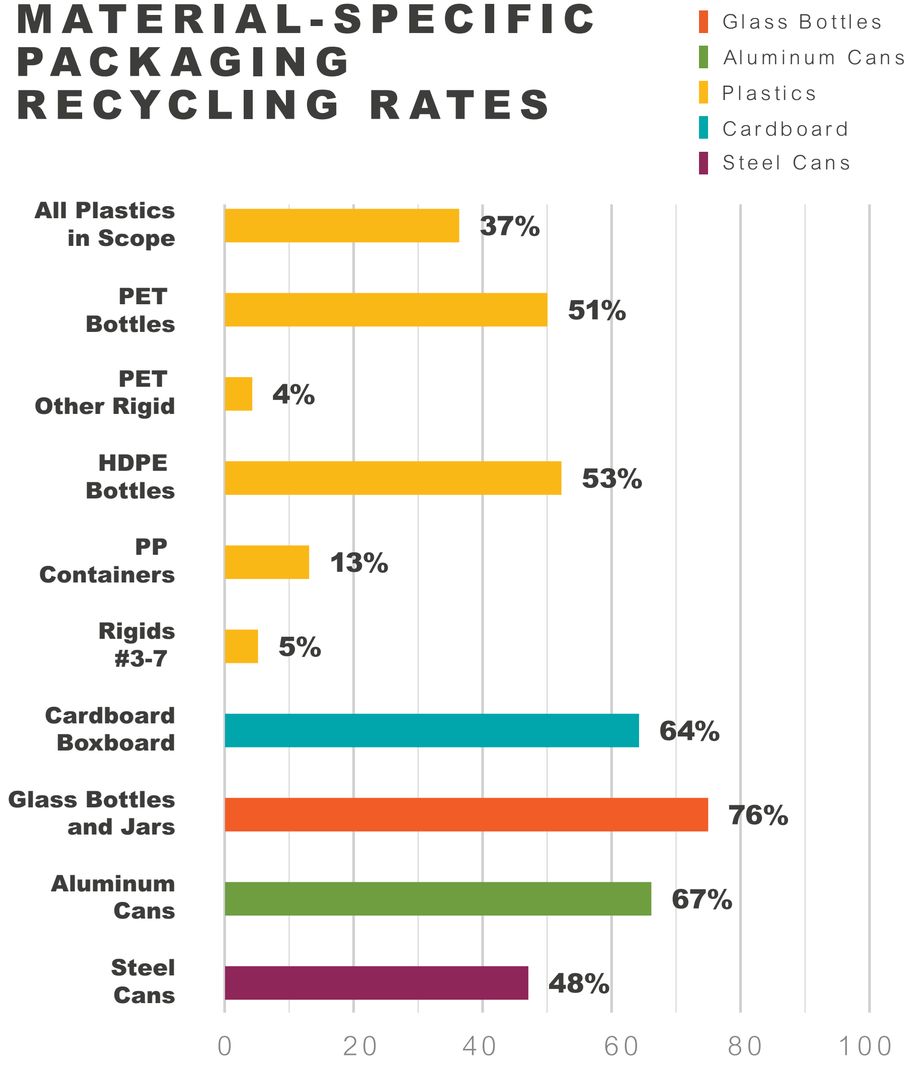
VERMONT

OVERVIEW

In 2012, Vermont passed its Universal Recycling Law Act 148.[196] This law banned curbside recyclables being disposed of in residents' trash bins. The law's major provisions began to come into effect starting in 2015, when residential trash charges began to be based on volume and weight of trash bags, and recyclables were officially banned from landfills. Vermont has reported that since this bill has been enacted, recycling rates across the state have begun to rise.

In addition to this law, Vermont has a bottle bill and keeps very comprehensive and granular records of the waste flows within its borders. Vermont currently reports its diversion rate as 35% as of 2018.[197]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



VERMONT

DATA

Vermont tracks all its disposed and recovered tonnage flows through its mandated facility reporting system, which is reported in the Vermont Material Destination Report. Transfer stations and other recycling facilities report their tonnage flows and assign high level material categories to the tons. Data is recorded for both landfilled and recycled tons.

KEY TAKEAWAYS

Recycling

- Vermont's CCPM recycling rate is ~62%, which is the 4th highest in the country.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans is ~62%. This is the 2nd highest in the country. One of the contributing factors to Vermont's high recycling rate is their packaging disposal ban.
- The materials with the highest recycling rates are those that are included in the state's DRS: glass bottles and jars (~76%, which is the second highest rate in the nation); PET bottles (~51%, which is above average for northeastern states), and HDPE bottles (~53%, which is %above average for northeastern states). ~45% of all rigid plastics packaging, glass bottles and jars, and steel and aluminum cans are captured through the state's deposit system. This is lower than most other DRS states because the Vermont system has not been expanded to include water.

Generation and Disposal

- Vermont generates ~317 lbs./capita/year of CCPM. This is within the lowest 20% of generation in the nation.
- With its recycling rate of ~62%, this leads to ~116lbs/capita/year of material disposed. This places Vermont among the 20% of states that dispose the least amount of material per capita. On a per capita basis, Vermont sends less material to disposal than average for the northeastern region.

Data

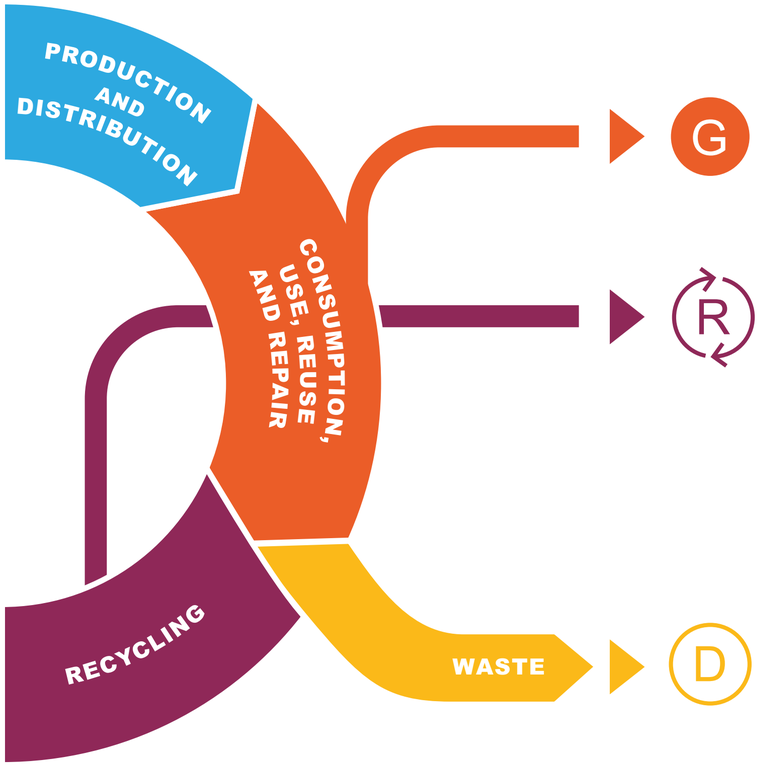
- Vermont tracks all its disposed and recovered tonnage flows through its mandated facility reporting system. Access to both recycling and disposal data enables better waste management planning and is likely to have contributed to Vermont being one of the highest performance states for CCPM recycling.

VIRGINIA

KEY FACTS

POPULATION	**8,535,519**
PERCENT URBAN	**75.5%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**3**
PERFORMANCE	
CCPM RECYCLING RATE	**42%**
CCPM GENERATION RANK	**4**
CCPM RECYCLING RANK	**20**
CCPM RECYCLING RANK without Cardboard	**25**
CCPM DISPOSAL RANK	**14**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Basic**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.28 million tons
300 lbs. per capita

PACKAGING RECYCLED
0.55 million tons
129 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.73 million tons
171 lbs. per capita

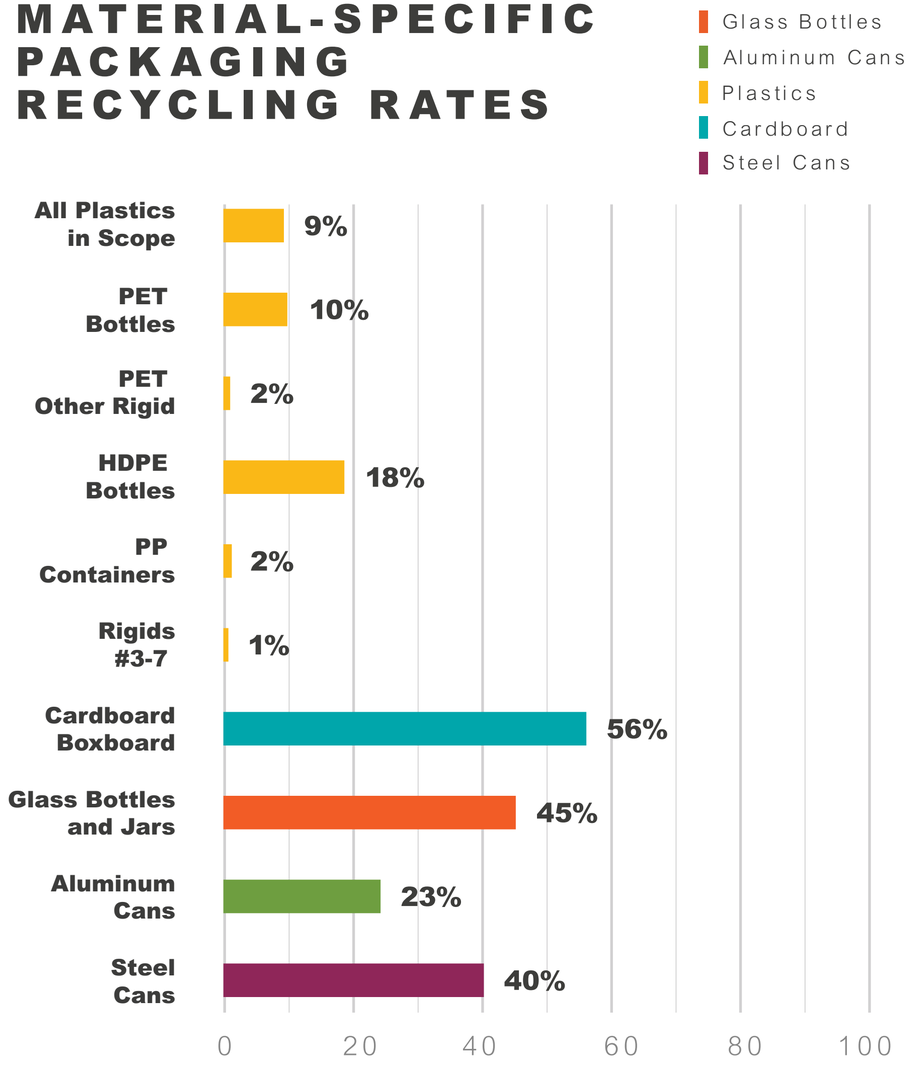
VIRGINIA

OVERVIEW

In recent years, Virginia has passed multiple laws aimed at increasing the supply of recycled material. Virginia has tasked the Department of Environmental Quality (DEQ) with monitoring current recycling rates and pushing for more beneficial use end-of-life strategies. The DEQ has focused on increasing economic incentives for recyclers over the next 10 years with tools such as recycling credits and tax incentives.[198]

As of 2017, Virginia calculates its own recycling rate as 42.8% based on a subset of data from 75% of its population.[199]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



VIRGINIA

DATA

Virginia Solid Waste Planning Units (SPWUs) with populations exceeding 100,000 are required to report their recycling and disposed materials.[200] These reports are high level and cover 117 localities within Virginia. SPWUs with populations below 100,000 can choose to voluntarily report their recycling and disposal activity. Between the mandatory and voluntary reporting, 75% of the state's population is represented in this reporting system.

KEY TAKEAWAYS

Recycling

- Virginia's CCPM recycling rate is ~42%, which is below the national average but is the 2nd highest rate in the south.
- Without the contribution of cardboard and boxboard, the recycling rate for rigid plastics packaging, glass bottles and jars, and steel and aluminum cans falls to ~23%, which is still among the top rates in the south.

Generation and Disposal

- Virginia generates ~300 lbs./capita/year of CCPM, which is among the lowest 10 generation rates in the nation. However, its modest recycling rate means that ~171 lbs./capita/year are disposed.
- Virginia has among the highest landfill fees in the south, though these are still unlikely to be high enough to incentivize increased waste diversion.

Data

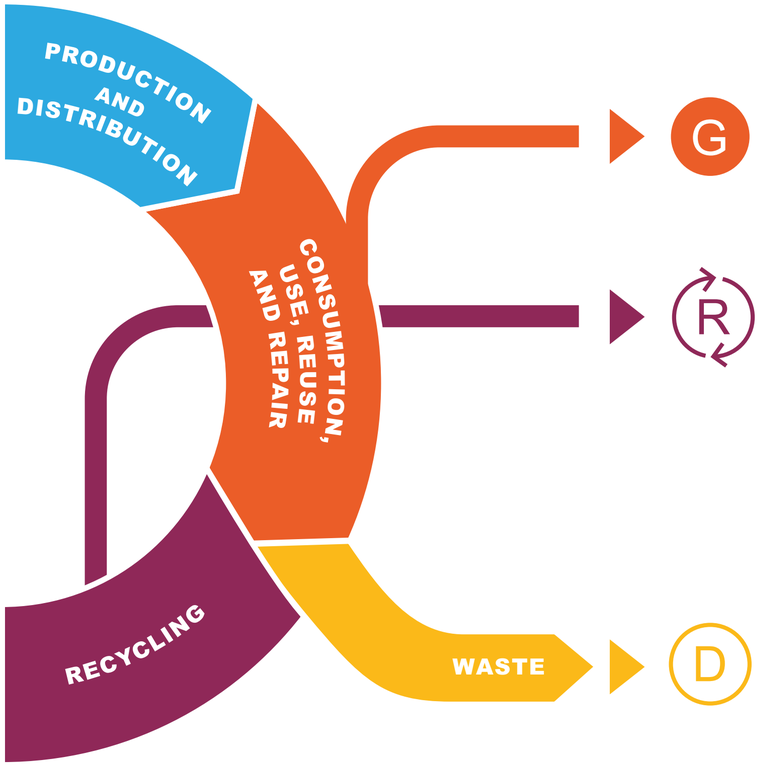
- Virginia's data reporting requirements are comprehensive and granular, but the waste characterization study is regional and outdated. A more recent, statewide waste characterization study would provide policy makers in the state with more insight into current trends, allowing them to plan accordingly. Virginia should also consider expanding reporting requirements to all municipalities.

WASHINGTON

KEY FACTS

POPULATION	**7,614,893**
PERCENT URBAN	**84.1%**
CENSUS SUB-REGION	**Pacific**
EPA REGION	**10**
PERFORMANCE	
CCPM RECYCLING RATE	**58%**
CCPM GENERATION RANK	**1**
CCPM RECYCLING RANK	**10**
CCPM RECYCLING RANK without Cardboard	**15**
CCPM DISPOSAL RANK	**2**
DATA	
AVAILABILITY AND QUALITY	**Good**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.99 million tons
262 lbs. per capita

PACKAGING RECYCLED
0.60 million tons
160 lbs. per capita

PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.38 million tons
102 lbs. per capita

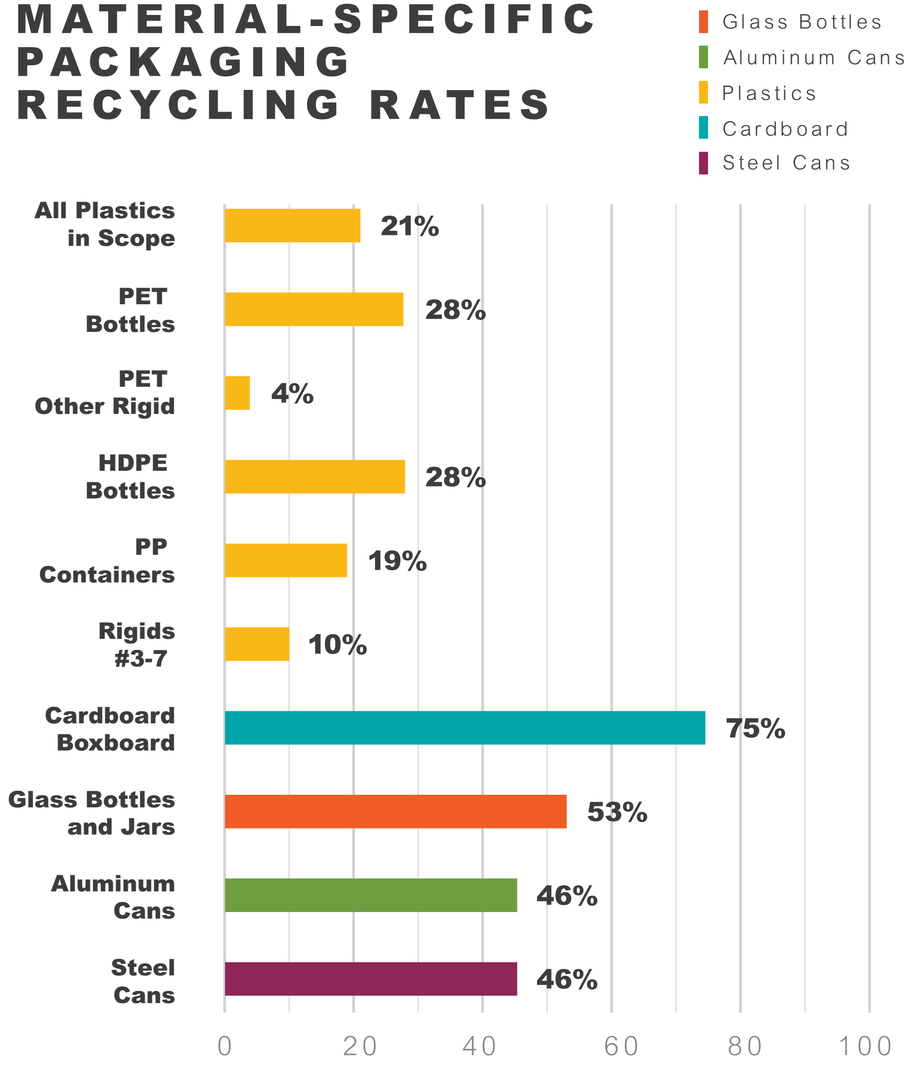
WASHINGTON

OVERVIEW

Washington state provides curbside recycling access to nearly 90% of its population.[201] Recycling services are provided by a combination of contracted haulers, municipally run programs, and unincorporated areas which have their services run by the Washington Utilities and Transportation Commission. [202]

Unlike its two neighbors to the south, Oregon and California, Washington does not have a bottle bill. The Department of Ecology has commissioned multiple reports in anticipation of expanded recycling laws going forward, however, such as the Washington Plastics Management Study, a result of Washington Law RCW 70.380. [203]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



WASHINGTON

DATA

Washington reports annual tons recovered at a very granular material level.

KEY TAKEAWAYS

Recycling

- Washington's CCPM recycling rate is ~58% which is the 10th highest in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars and steel and aluminum cans is ~41%.
- Washington has a high recycling rate for glass, at ~59%, but the recycling rates of PET bottles at ~29% and aluminum cans at ~45% are modest compared to other high performing states, such as its neighbor Oregon.

Generation and Disposal

- Washington generates ~258lb/capita per year of CCPM, which is among the lowest 10 states.
- The ~102lbs/capita disposed per year are a result of the low generation and relatively high recycling rate.
- The average landfill fee for Washington is among the highest in the nation.

Data

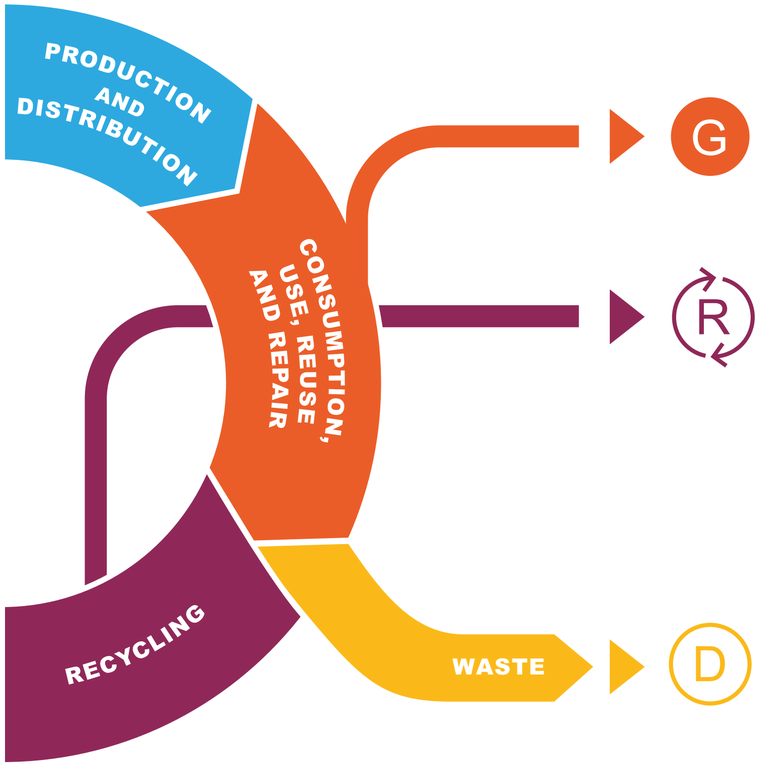
- Washington has very granular material reporting, but its waste characterization could be more current. Access to data both on recycling and disposal enables better planning and is likely to have contributed to Washington being one of the highest performance states for CCPM.

WEST VIRGINIA

KEY FACTS

POPULATION	**1,792,147**
PERCENT URBAN	**48.7%**
CENSUS SUB-REGION	**South Atlantic**
EPA REGION	**3**
PERFORMANCE	
CCPM RECYCLING RATE	**31%**
CCPM GENERATION RANK	**23**
CCPM RECYCLING RANK	**40**
CCPM RECYCLING RANK without Cardboard	**50**
CCPM DISPOSAL RANK	**42**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.31 million tons
342 lbs. per capita

PACKAGING RECYCLED
0.09 million tons
105 lbs. per capita

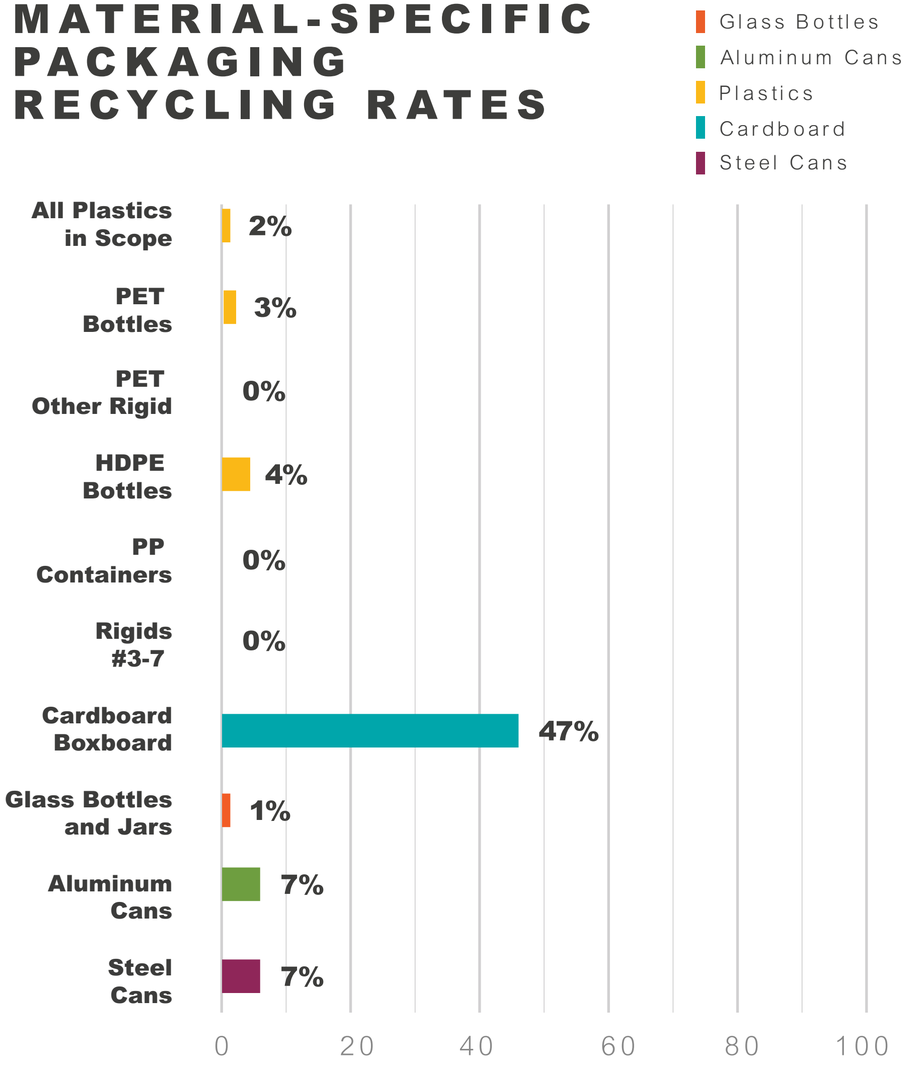
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.21 million tons
237 lbs. per capita

WEST VIRGINIA

OVERVIEW

The West Virginia Department of Environmental Protection manages the permitting for all waste facilities in the state. [204] The West Virginia Solid Waste Management Board (SWMB) facilitates solid waste planning statewide and published a biennial Solid Waste Management Plan. [205]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



WEST VIRGINIA

DATA

The most recent West Virginia Solid Waste Management Plan is from 2019 and provides data on garbage and recycling tonnages. [206] The report also provides a recycling composition for all 7 waste sheds in the states.

KEY TAKEAWAYS

Recycling

- West Virginia's CCPM recycling rate is ~31% which is 40th highest in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars and steel and aluminum cans is ~2%. This is the lowest rate in the country.

Generation and Disposal

- West Virginia generates ~342 lbs./capita per year of CCPM putting it near the median for per capita generation across all fifty states. With its recycling rate of ~31% this leads to ~237 lbs./capita disposed per year. This puts West Virginia among the 10 states that dispose the most material per capita nationwide.

Data

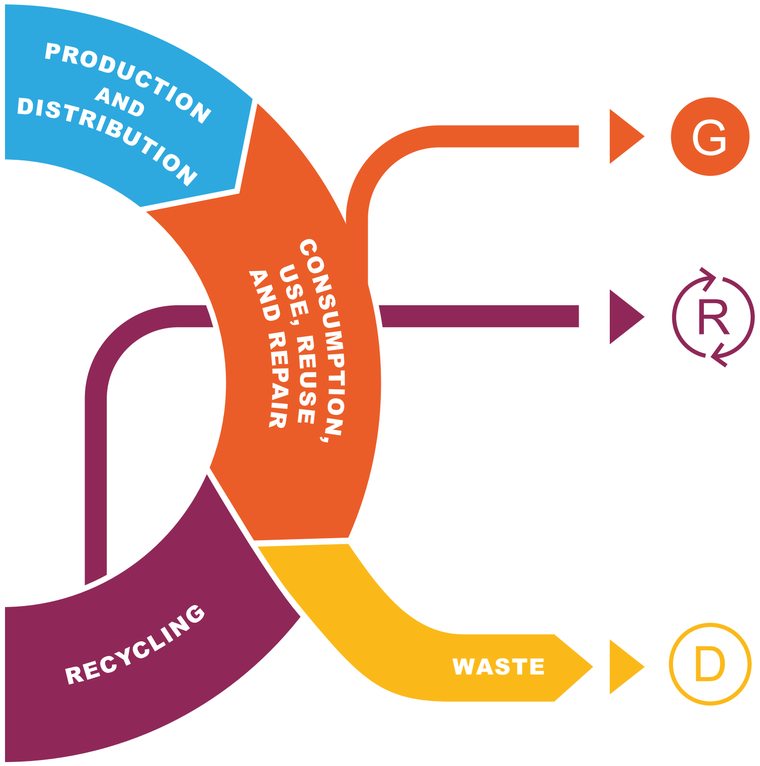
- West Virginia should consider undertaking a statewide waste characterization to better understand waste composition in the state in recent years. The state should also consider implementing data reporting requirements for municipalities and waste and recycling facilities on a regular basis.

WISCONSIN

KEY FACTS

POPULATION	**5,822,434**
PERCENT URBAN	**70.2%**
CENSUS SUB-REGION	**East North Central**
EPA REGION	**5**
PERFORMANCE	
CCPM RECYCLING RATE	**40%**
CCPM GENERATION RANK	**30**
CCPM RECYCLING RANK	**23**
CCPM RECYCLING RANK without Cardboard	**12**
CCPM DISPOSAL RANK	**26**
DATA	
AVAILABILITY AND QUALITY	**Fair**
SYSTEMS	**Good**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
1.03 million tons
355 lbs. per capita

PACKAGING RECYCLED
0.43 million tons
148 lbs. per capita

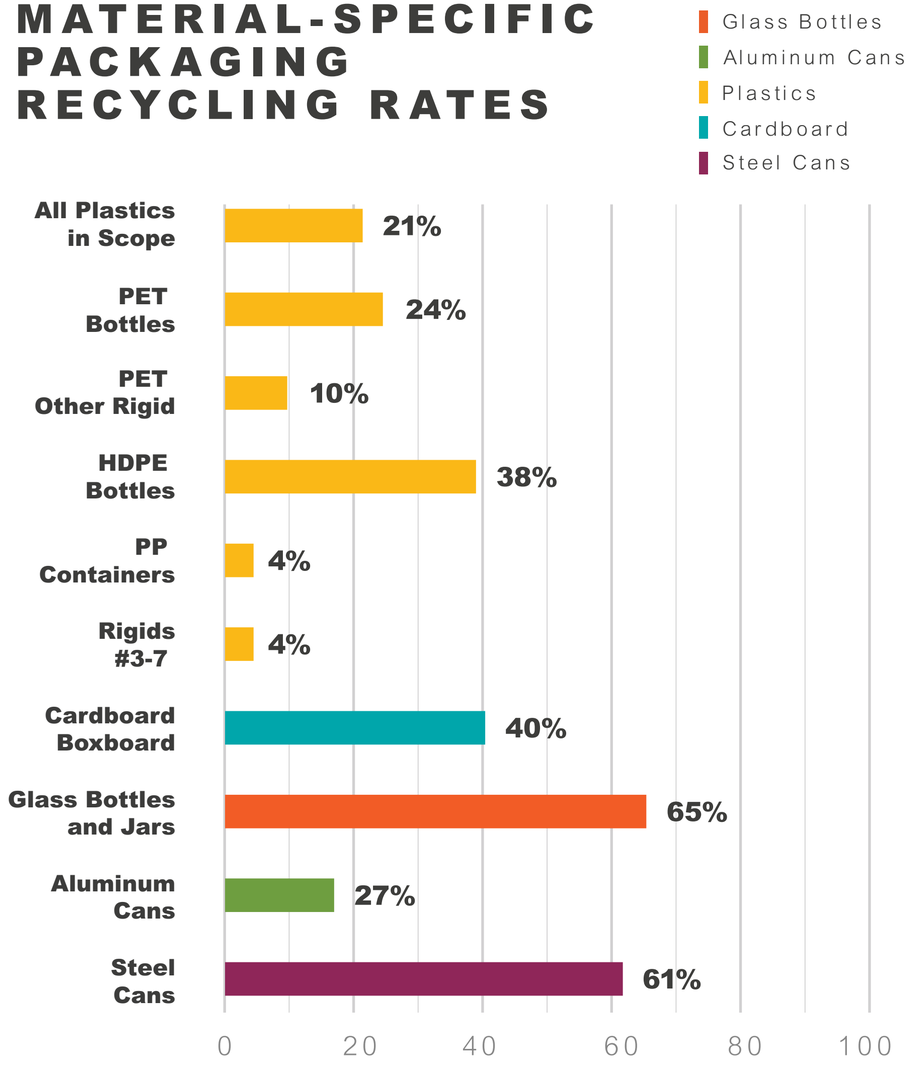
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.43 million tons
148 lbs. per capita

WISCONSIN

OVERVIEW

The Wisconsin Department of Natural Resources manages solid waste facilities in the state.[207] According to Wisconsin's 1990 recycling law, all residents put have access to a curbside recycling program or drop off centers within easy access.[208] Local units of government, called responsible units or RUs, such as counties or municipalities, maintain municipal recycling programs to ensure that residents and businesses comply with state and local recycling requirements. [209]

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



WISCONSIN

DATA

The Wisconsin Department of Natural Resources (WDNR) publishes annual recycling tonnages along with a more detailed breakdown of material categories. [210] [211] The WDNR also provides "Tonnages for Self-Certified MRFs That Processed Wisconsin Recyclables." [212]

KEY TAKEAWAYS

Recycling

- Wisconsin's CCPM recycling rate is ~40% which is 25th highest in the country and 5th highest among the Midwest states.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars and steel and aluminum cans is ~44%. This is 12th highest in the country.
- ~61% of ferrous cans are recycled which is highest among the Midwest states.

Generation and Disposal

- Wisconsin generates ~355 lbs./capita/year of CCPM putting Wisconsin near the median of per capita generation nationwide. With its recycling rate of ~40% this leads to ~207 lbs./capita disposed per year. This puts Wisconsin near the median for per capital disposal across the country.

Data

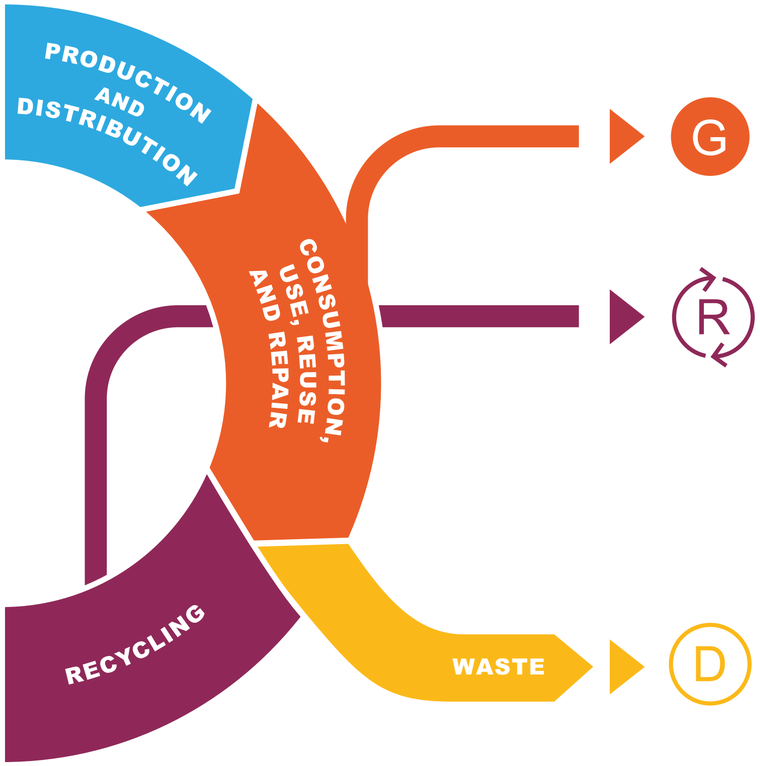
- WDNR publishes annual recycling tonnages with a breakdown of material categories but should also consider implementing a regular waste characterization for Wisconsin to better understand waste composition in the state.

WYOMING

KEY FACTS

POPULATION	**578,759**
PERCENT URBAN	**64.8%**
CENSUS SUB-REGION	**Mountain**
EPA REGION	**8**
PERFORMANCE	
CCPM RECYCLING RATE	**33%**
CCPM GENERATION RANK	**14**
CCPM RECYCLING RANK	**37**
CCPM RECYCLING RANK without Cardboard	**37**
CCPM DISPOSAL RANK	**30**
DATA	
AVAILABILITY AND QUALITY	**Limited**
SYSTEMS	**None**

CIRCULAR ECONOMY METRICS



PACKAGING GENERATED
0.10 million tons
333 lbs. per capita

PACKAGING RECYCLED
0.04 million tons
119 lbs. per capita

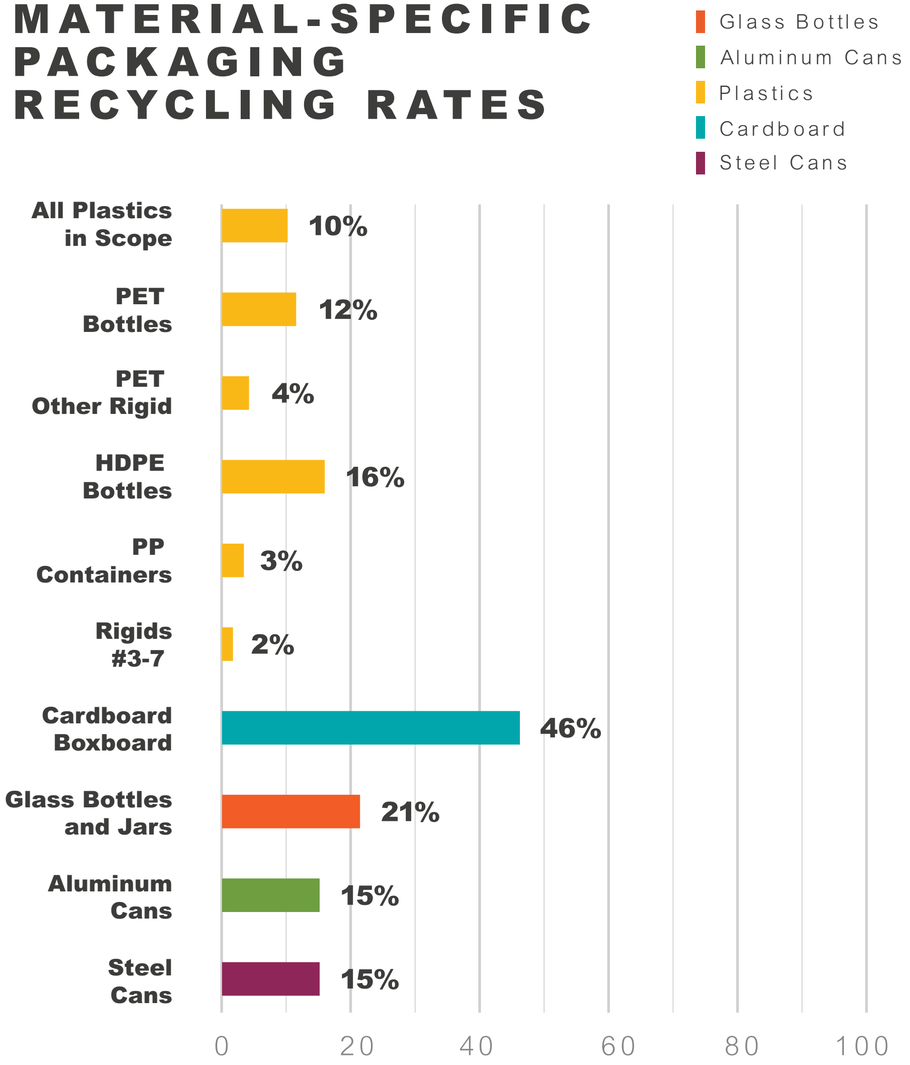
PACKAGING DISPOSED
(LANDFILL/INCINERATION)
0.06 million tons
214 lbs. per capita

WYOMING

OVERVIEW

Wyoming Department of Environmental Quality's (WDEQ) Solid and Hazardous Waste Division oversees the Recycling Program. [213] The WY Integrated Solid Waste Management Program, begun in 2006, mandates local governments maintain a plan for disposing, treating, or recycling solid waste.[214] There is currently no statewide legislation regarding post-consumer packaging in Wyoming.

MATERIAL-SPECIFIC PACKAGING RECYCLING RATES



WYOMING

DATA

Wyoming DEQ does not require entities (landfills or recycling centers) to report tonnages or waste composition. [215] The state's last Solid Waste Diversion study was published in 2013 and used 2010 data. [216]

KEY TAKEAWAYS

Recycling

- Wyoming's CCPM recycling rate is ~33% which is among the 20 lowest performing states in the country.
- Without the contribution of cardboard and boxboard the recycling rate for rigid plastics packaging, glass bottles and jars and steel and aluminum cans is ~5%.
- Wyoming's recycling rates with and without cardboard and boxboard are both below average for the Western states.

Generation and Disposal

- Wyoming generates ~333 lbs./capita/year of CCPM, which is less than 60% of the states in the nation.
- Wyoming's below average recycling rate leads to a disposal of ~210 lbs./capita/year, which is near the average for per capita disposal across the nation and within the western states.
- The average landfill fee for Wyoming is higher than average for the Western states.

Data

- Wyoming should consider implementing a waste characterization to better understand waste composition in the state. The state should also consider setting up a data reporting system for municipalities and waste and recycling facilities to collect data more frequently.

KEY TERMS

TERM/ACRONYM	DEFINITION
Commercial Waste	Waste generated from private businesses, industrial operations, and institutions.
Common Containers and Packaging Material (CCPM)	Packaging generated from residential and commercial sectors, which this study has defined in such a way to cover the main types of packaging for which data was available to calculate a recycling rate. Includes: ▪ PET bottles ▪ PET other rigid plastics (including thermoforms, trays) ▪ HDPE bottles ▪ PP ▪ Rigids #3-#7 ▪ Glass bottles and jars ▪ Aluminum cans ▪ Steel cans
Contamination	Unaccepted or non-target material in a recycling stream that must be sorted from recyclables as well as non-recyclable material that leads to yield loss such as food or beverage remnants, adhesives, moisture, etc.
Deposit Refund System (DRS)	Also called container deposit systems or “bottle bills,” these programs place a refundable deposit on beverage containers, which is returned to consumers when they bring back empty containers for recycling and/or reuse at a redemption location.

TERM/ACRONYM	DEFINITION
Disposed	Material that is either landfilled or incinerated.
Extended Producer Responsibility (EPR)	A mandatory type of product stewardship policy that includes, at a minimum, a requirement that the manufacturer's responsibility for its product and/or packaging extends to the post-consumer end-of-life stage. There are two key features of EPR policy: (1) shifting the financial and/or operational responsibility for a product or packaging's end of-life management from the public sector to the manufacturer, with state government oversight; and (2) providing incentives to manufacturers to incorporate environmental considerations into the design of their products and packaging.
Generated	The total amount of material that is collected for recycling and disposed. Generated = Recycled + Disposed
Greenhouse Gas (GHG)	A gas that contributes to the greenhouse effect by absorbing infrared radiation (e.g., carbon dioxide, methane, and chlorofluorocarbons).
High-density polyethylene (HDPE)	A strong, durable, lightweight, and chemically resistant plastic material popular for a variety of applications, including rigid plastics. Coded as plastic resin #2.
Landfill	A specially engineered site for disposal of solid waste by burying in the ground. The waste is generally spread in thin layers, which are then covered with soil or other materials.
Lbs.	Pounds, a measure of weight

TERM/ACRONYM	DEFINITION
Low-density polyethylene (LDPE)	A soft, flexible, lightweight plastic material. It is often used for sandwich bags and cling wrap. Coded as plastic resin #4.
Material Recovery Facility (MRF)	A facility where recyclables are sorted into specific categories and processed, or transported to processors, for remanufacturing. (U.S. EPA, 1994d)
Municipal Solid Waste (MSW)	Municipal Solid Waste, as defined by the Environmental Protection Agency, means discards from residential and commercial sources that does not contain regulated hazardous wastes. (U.S. EPA National Measurement Workgroup, 2013)
Polyethylene Terephthalate (PET)	A clear, strong, and lightweight plastic that is widely used for packaging food and beverages, especially convenience-sized soft drinks, juices, and water. Coded as plastic resin #1.
Polypropylene (PP)	A thermoplastic used in a variety of applications, including packaging for consumer products like yogurt pots and margarine containers and many plastic bottle caps. Coded as plastic resin #5.
Primary Material	Material used to manufacture packaging that is made from virgin resources.
Processor	Also called a reclaimer, these companies purchase post-consumer or post-industrial recycled commodities and process them into resin feedstock to sell to manufacturers. For plastics processors, end products include pellet, flake, and other resin products. Some vertically integrated processors also have manufacturing operations and may use the recycled feedstock they reprocess in the production of their own products.

TERM/ACRONYM	DEFINITION
Producer	A brand owner, first importer, or franchisor that supplies designated packaging and paper products to consumers in a jurisdiction where producer responsibility obligations have been regulated. A manufacturer is not necessarily a producer in the context of EPR. In the case of a plastic bottle, for example, the producer is the company that uses the plastic bottle as packaging and sells it under its own brand, whereas the manufacturer is the company that makes the plastic bottle.
Recovery	In the context of this study, material that is diverted from the solid waste stream for the intended purpose of recycling.
Residues	Remnants of the product that remains in the container or on the packaging that is being recycled (e.g., dried yogurt remaining in yogurt cups, liquid in beverage containers, etc.
Recycling Rate	One indicator of a recycling system's performance. The greater percentage of CCPM recycled, the less disposed. The recycling rates presented in this study are calculated based on the tons used by processors (not the amount collected for recycling) divided by the amount of material generated.
Residential Waste	Waste generated from single-family and multi-family households.
Secondary Material	Material used to manufacture packaging that is made from resources that have previously been recycled.
Single Stream	A system in which multiple recyclable materials are combined for collection, with no sorting required by the generator (residential, commercial, or industrial). Sorting is performed at a central location, such as at an MRF.

TERM/ACRONYM	DEFINITION
Sorting Facility	Also sometimes called a recycling processor or material recovery facility (MRF), an establishment primarily engaged in sorting fully or partially mixed recyclable materials into distinct categories and preparing them for shipment to recycling markets.
Tipping Fee	Fee paid by haulers to dump loads of trash or recycling at a landfill, incineration, or recycling facility.
Waste Diversion	The act of redirecting waste away from landfill disposal and incineration and instead into recycling or other beneficial uses.
Waste Stream	The flow of solid waste from its source, such as households or businesses, through to recovery, recycling, or final disposal.

APPENDICES

APPENDIX - CALCULATION PROCESS

An overview of the processes used to gather, collate, and review data, as well as to calculate state comparable weight and performance metrics, are summarized in Figure 7 and Figure 8. Further detail is included in a separate Technical Appendix. Figure 8 provides and overview of the methodology that was deployed to address data gaps.

FIGURE 7: OVERVIEW OF DATA GATHERING AND ANALYSIS PROCESS

- Research published primary and secondary data
- Interviews with industry representatives
- FOIA request for unpublished data held by state authorities

Review the following:

- Age of data
- Comprehensiveness - residential and/or commercial
- Granularity, plastics only or plastics by polymer
- Reliability - source of data
- Robustness - approach taken from example to carry out characterization.

- Address data gaps
- Estimate clean, dry CCPM (removal of moisture, dirt and residues in disposed and recycled material)
- Calculate and apply loss rates for MRFs and processors
- Calculate tonnage recycled and total disposed.

- Estimate recycling rate and generation of different CCPMs for states with recycled tonnages but not CCPM or vice versa.

- Estimate recycling rate and generation of different CCPMs for states with no recycling data by comparing to other states in same census grouping.

- Calculate pounds per capita generated, recycled, and disposed.
- Calculate recycling rate
- Rank states

FIGURE 8: METHODOLOGY FOR ADDRESSING DATA GAPS

Data Issue	Methodology Applied
1 LACK OF STATE-WIDE DATA	**Use regional data if available from counties/municipalities:** • Identify tons per capita at the regional level • Scale to state level on a per capita basis (accounting for urban rural differences) **Account for differences in performance between performance between the areas represented by the data and the whole state (e.g. rural/urban)**
2 INSUFFICIENT IDENTIFICATION OF INDIVIDUAL CCPMS	**Apply compositional splits to reportes recycled and disposed materials:** • Identify CCPMs in single stream/mixed recycling tons • Identify CCPMs within material reportes at higher level categories (e.g “papers”, “non-ferrous” or “plastics”) • Identify different CCPMs within sold recycling (e.g. PPwithin mixed #3-7 bales).
3 SIGNIFICANT GAPS IN REPORTED DATA	**Addressing key data gaps:** • Where the residual characterization was only on MSW from households, an estimate of the composition of commercial waste in the remaining CCPM. • Commercial cardboard recycling was widely under-reported, and so, for a number of states, the state-reported data on the quantity of cardboard recycled was not used in the final modelling. • It was not possible to identify more minor tonnages of unreported recycling in cases where reporting was not fully comprehensive.
4 DATA SOURCE PRIOR TO 2018	**Apply national growth per capita in EPA generation until 2018 to estimate growth at a state level.**

ADJUSTMENTS

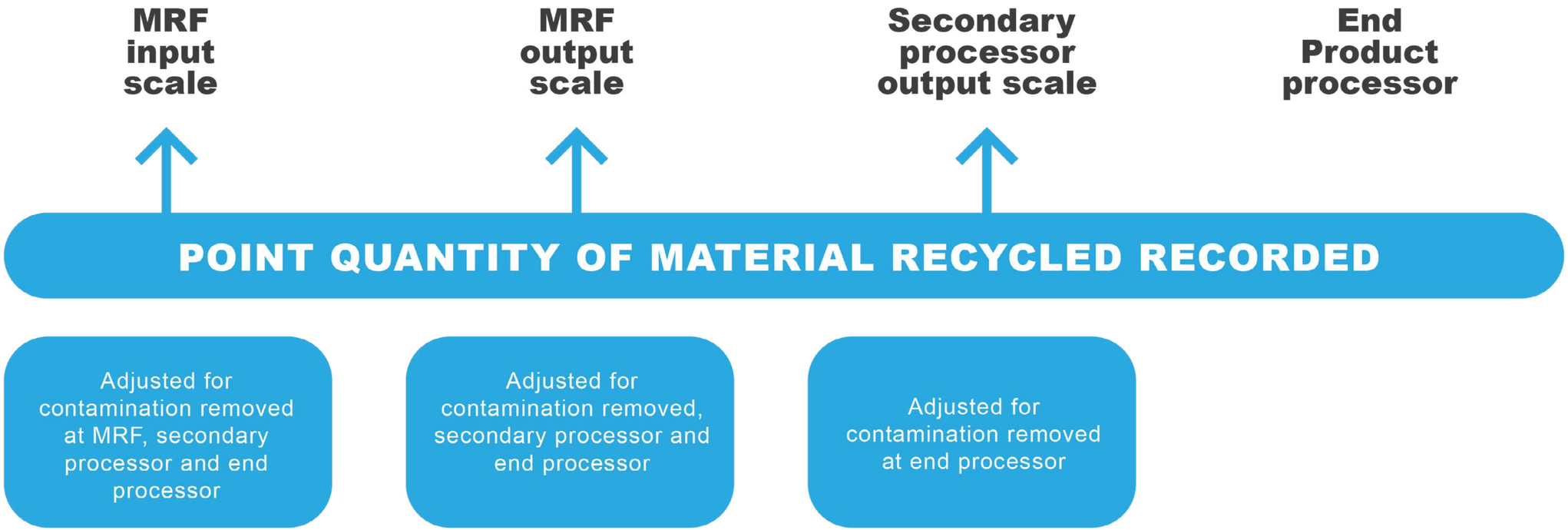
Recycling

Material loss can occur at the MRF as well as at the processor, and loss rates are different for different packaging materials:

- Sorting losses at the MRF are a result of material missed by sorting equipment or manual pickers, or collected material not being of sufficient quality to be marketed (e.g., too highly contaminated). Material missed by sorting equipment can be caused by:
  - Issues related to packaging design (e.g., black plastics cannot be detected by optical sorters).
  - Packaging size (e.g., too small to be detected and therefore lost to residual stream).
  - Residues of the product that the container impacting on the weight of the container and its ability to be correctly separated. Residue rates for some packaging types, like yogurt cups, are likely to be greater than for others such as beverage containers.
  - No-target material impacting the shape of a container e.g., flattening 3-D items reducing the ability of the MRF equipment to effectively recognize and separate it into the correct stream.
- Sorting losses differ by facility and depend also on the scale of operation and process design within the MRF, the degree to which the MRF is operating effectively (within design parameters, with well-maintained sorting equipment, and sorting speeds), and the fluctuation in prices for different grades of sorted material.
- Processing losses include moisture, dirt, labels, coatings, caps, and glues.

The state recycling data has been adjusted to consider all points of loss shown in Figure 9. Further details are provided in a separate Technical Appendix.

FIGURE 9: POINTS IN THE RECYCLING PROCESS WHERE YIELD LOSS OCCURS



DISPOSAL

To ensure that recycling rates are not underestimated, adjustments have also been made to the disposed tonnages to account for product residue, moisture, and dirt, etc. The adjustments are not the same because packaging disposed will contain more dirt for example than that collected for recycling.

REGIONAL AVERAGES BASED ON CENSUS SUBGROUPS

In states where data was limited, we used census sub-regional averages reviewed against EPA national averages, taking into consideration consumption patterns and access to curbside services, to calculate recycling and disposal rates.

APPENDIX - RESULTS

Following table shows the pounds per capita, generated, recycled, and disposed for each CCPM material for 2018, as well as the data availability, quality, and systems scores.

ALABAMA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	28	349	46.6	18.8	4.2	12.5	7.0	4.1	223.6	62.1	8.2	8.7
LBS/CAPITA DISPOSED	48	265	44.0	17.7	4.0	11.4	6.8	4.0	152.9	53.3	6.9	7.8
LBS/CAPITA RECYCLED	46	84	2.6	1.0	0.2	1.1	0.2	0.1	70.7	8.8	1.3	0.9

Data Quality Limited **Data Systems** Basics

ALASKA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	5	302	43.6	14.7	4.2	11.9	7.0	5.8	192.5	49.7	7.7	8.1
LBS/CAPITA DISPOSED	44	248	43.0	14.5	4.2	11.8	6.9	5.7	146.2	44.4	7.5	7.4
LBS/CAPITA RECYCLED	50	53	0.6	0.2	0.0	0.1	0.2	0.1	46.3	5.4	0.2	0.7

Data Quality Limited **Data Systems** None

ARIZONA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	10	325	45.7	18.1	4.6	11.9	7.0	4.1	223.6	40.3	6.4	9.0
LBS/CAPITA DISPOSED	21	196	39.4	15.4	4.2	9.0	6.8	4.0	112.6	31.2	5.4	7.7
LBS/CAPITA RECYCLED	31	129	6.3	2.7	0.4	2.9	0.2	0.1	111.0	9.1	1.0	1.3

Data Quality Fair **Data Systems** Basic

ARKANSAS

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	19	340	48.0	18.8	4.2	13.9	7.0	4.1	224.0	50.0	8.2	9.6
LBS/CAPITA DISPOSED	41	234	44.4	17.7	4.2	11.9	6.6	4.1	135.6	38.8	7.2	8.4
LBS/CAPITA RECYCLED	39	105	3.5	1.0	0.0	2.0	0.5	0.0	88.4	11.1	1.0	1.3

Data Quality Fair **Data Systems** Basic

CALIFORNIA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	41	376	54.8	18.6	7.6	11.8	10.5	6.3	226.2	76.2	8.0	10.8
LBS/CAPITA DISPOSED	15	172	38.4	8.0	6.7	8.8	9.3	5.5	89.6	35.0	1.8	7.6
LBS/CAPITA RECYCLED	9	204	16.4	10.6	0.9	3.0	1.2	0.8	136.6	41.2	6.2	3.1

Data Quality Good **Data Systems** Good

COLORADO

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	21	341	66.4	26.3	4.2	22.7	7.8	5.4	171.5	74.4	9.9	18.6
LBS/CAPITA DISPOSED	37	229	60.6	24.1	4.1	19.5	7.5	5.3	86.9	57.3	8.5	15.2
LBS/CAPITA RECYCLED	38	112	5.8	2.2	0.1	3.2	0.2	0.1	84.6	17.1	1.4	3.4

Data Quality Good **Data Systems** Good

CONNECTICUT

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	45	382	46.5	22.2	3.1	12.5	5.5	3.3	243.1	78.5	7.8	5.9
LBS/CAPITA DISPOSED	7	129	31.4	11.8	2.9	8.9	4.7	3.1	63.9	26.6	3.0	4.5
LBS/CAPITA RECYCLED	2	252	15.1	10.4	0.1	3.6	0.9	0.2	179.2	51.9	4.8	1.4

Data Quality Good **Data Systems** Good

DELAWARE

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	50	397	41.1	18.8	3.9	12.4	3.8	2.2	247.5	88.2	8.1	12.5
LBS/CAPITA DISPOSED	12	159	36.2	17.1	3.7	10.4	3.1	2.0	75.5	34.3	5.2	8.1
LBS/CAPITA RECYCLED	4	238	5.0	1.7	0.3	1.9	0.7	0.3	172.0	54.0	2.9	4.4

Data Quality Good **Data Systems** Good

FLORIDA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	47	388	64.1	28.3	6.2	10.5	11.9	7.3	225.8	61.5	12.5	23.7
LBS/CAPITA DISPOSED	31	215	59.1	26.3	6.0	8.5	11.3	7.0	87.0	41.1	9.4	18.0
LBS/CAPITA RECYCLED	17	173	5.0	2.0	0.2	2.0	0.6	0.2	138.8	20.4	3.1	5.7

Data Quality Good **Data Systems** Good

GEORGIA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	36	363	54.3	22.4	4.2	15.3	7.0	5.3	232.1	57.0	9.7	10.1
LBS/CAPITA DISPOSED	34	222	49.1	20.5	4.0	12.9	6.7	5.0	114.4	43.4	7.8	7.6
LBS/CAPITA RECYCLED	24	141	5.1	1.9	0.2	2.4	0.4	0.3	117.7	13.6	1.9	2.5

Data Quality Limited **Data Systems** None

HAWAII

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	48	394	55.6	26.3	4.2	10.9	8.4	5.8	224.2	96.2	9.9	7.8
LBS/CAPITA DISPOSED	23	203	41.3	14.9	4.0	8.9	7.9	5.6	96.0	53.9	3.9	7.5
LBS/CAPITA RECYCLED	12	191	14.3	11.5	0.2	2.0	0.5	0.2	128.3	42.3	6.0	0.3

Data Quality Good **Data Systems** Basic

IDAHO

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	20	340	47.3	18.8	4.2	13.2	7.0	4.1	225.5	50.0	8.2	9.4
LBS/CAPITA DISPOSED	27	208	42.0	16.3	4.0	10.9	6.8	4.0	112.9	38.4	6.9	7.8
LBS/CAPITA RECYCLED	29	132	5.3	2.5	0.2	2.3	0.2	0.1	112.6	11.5	1.4	1.6

Data Quality Limited **Data Systems** None

ILLINOIS

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	44	380	52.8	21.8	5.6	15.3	6.0	4.1	239.5	62.5	10.7	14.6
LBS/CAPITA DISPOSED	46	254	47.2	19.2	5.4	12.7	5.8	4.0	141.4	46.0	8.1	11.0
LBS/CAPITA RECYCLED	34	126	5.6	2.6	0.1	2.7	0.2	0.1	98.1	16.5	2.6	3.6

Data Quality Fair **Data Systems** Good

INDIANA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	32	357	50.5	20.8	4.2	13.0	7.0	5.4	226.2	62.5	9.1	9.3
LBS/CAPITA DISPOSED	40	233	41.7	17.5	3.9	8.8	6.3	5.1	137.0	40.5	7.5	5.8
LBS/CAPITA RECYCLED	35	125	8.8	3.3	0.3	4.2	0.7	0.3	89.2	22.0	1.5	3.5

Data Quality Fair **Data Systems** Good

IOWA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	34	363	50.9	21.3	5.5	13.5	7.0	3.6	227.4	62.6	12.1	9.5
LBS/CAPITA DISPOSED	8	130	41.6	14.9	5.3	11.1	6.8	3.4	56.4	21.0	2.9	7.7
LBS/CAPITA RECYCLED	5	233	9.4	6.3	0.2	2.4	0.3	0.1	171.0	41.6	9.1	1.8

Data Quality Fair **Data Systems** None

KANSAS

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	37	363	48.2	17.4	4.2	16.0	7.0	3.6	227.0	69.3	8.6	10.3
LBS/CAPITA DISPOSED	36	223	41.6	14.5	4.0	12.9	6.7	3.4	130.4	36.6	6.4	7.7
LBS/CAPITA RECYCLED	25	141	6.6	2.9	0.2	3.1	0.3	0.2	96.6	32.8	2.1	2.6

Data Quality Limited **Data Systems** None

KENTUCHY

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	25	345	50.3	23.1	4.1	10.6	8.1	4.5	227.0	50.3	6.6	10.7
LBS/CAPITA DISPOSED	47	255	46.8	21.3	3.8	9.4	7.8	4.4	153.8	39.3	5.5	9.5
LBS/CAPITA RECYCLED	45	90	3.6	1.9	0.2	1.2	0.2	0.1	73.2	11.0	1.1	1.2

Data Quality Fair **Data Systems** Good

LOUISIANA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	17	336	46.5	18.8	4.2	12.4	7.0	4.1	222.8	50.0	8.2	8.6
LBS/CAPITA DISPOSED	43	239	44.3	18.0	4.1	11.7	6.6	3.9	130.5	48.6	7.4	8.2
LBS/CAPITA RECYCLED	43	97	2.2	0.8	0.1	0.7	0.5	0.2	92.3	1.4	0.9	0.4

Data Quality Limited **Data Systems** Basic

MAINE

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	40	376	41.2	20.9	2.0	7.1	7.6	3.7	222.2	96.9	10.0	5.5
LBS/CAPITA DISPOSED	1	91	17.9	4.5	1.8	3.0	5.4	3.2	51.2	16.6	1.5	3.9
LBS/CAPITA RECYCLED	1	285	23.3	16.4	0.2	4.0	2.1	0.6	171.0	80.3	8.5	1.6

Data Quality Fair **Data Systems** Basic

MARYLAND

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	7	309	65.4	24.7	4.4	21.4	9.4	5.6	143.5	62.1	12.1	25.8
LBS/CAPITA DISPOSED	17	181	45.3	17.3	3.7	11.6	7.8	4.9	88.9	29.8	5.5	11.2
LBS/CAPITA RECYCLED	33	128	20.2	7.4	0.6	9.8	1.6	0.7	54.6	32.2	6.6	14.6

Data Quality Good **Data Systems** Good

MASSACHUSETTS

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	42	378	41.5	17.4	3.2	9.6	7.0	4.3	235.7	82.3	7.7	10.8
LBS/CAPITA DISPOSED	16	177	29.7	10.8	2.9	6.3	5.9	3.8	113.9	24.1	2.3	6.7
LBS/CAPITA RECYCLED	10	201	11.8	6.6	0.3	3.4	1.1	0.4	121.9	58.1	5.4	4.2

Data Quality Good **Data Systems** Good

MICHIGAN

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	29	352	47.0	15.2	4.2	15.2	7.0	5.4	227.4	58.6	9.1	10.0
LBS/CAPITA DISPOSED	28	210	28.8	6.5	4.0	6.7	6.5	5.0	147.2	26.0	1.3	6.5
LBS/CAPITA RECYCLED	23	142	18.3	8.7	0.2	8.4	0.5	0.4	80.2	32.6	7.8	3.6

Data Quality Good **Data Systems** Good

MINNESOTA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	12	331	35.9	10.9	5.1	12.3	4.5	3.1	197.1	82.0	6.1	10.4
LBS/CAPITA DISPOSED	6	125	30.7	8.2	5.0	10.0	4.4	3.0	58.2	27.6	3.5	5.4
LBS/CAPITA RECYCLED	8	206	5.2	2.7	0.1	2.3	0.0	0.1	138.9	54.4	2.7	4.9

Data Quality Good **Data Systems** Good

MISSISSIPPI

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	24	343	45.9	18.8	4.2	11.8	7.0	4.1	218.3	62.5	8.2	7.9
LBS/CAPITA DISPOSED	50	280	44.0	18.0	4.1	11.0	6.9	4.0	165.9	55.7	7.2	7.3
LBS/CAPITA RECYCLED	49	63	1.9	0.8	0.1	0.8	0.2	0.1	52.4	6.7	1.0	0.6

Data Quality Limited **Data Systems** None

MISSOURI

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	33	359	43.8	17.4	3.0	13.0	6.4	4.1	229.7	64.0	8.6	12.4
LBS/CAPITA DISPOSED	18	185	38.2	15.8	2.7	10.1	5.7	3.8	95.4	34.9	7.0	9.2
LBS/CAPITA RECYCLED	15	174	5.6	1.6	0.2	2.9	0.6	0.3	134.4	29.1	1.6	3.2

Data Quality Fair **Data Systems** None

MONTANA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	16	335	46.2	18.8	4.2	12.1	7.0	4.1	222.6	50.0	8.2	8.3
LBS/CAPITA DISPOSED	32	215	41.4	16.5	4.0	10.1	6.8	4.0	119.9	39.3	7.0	7.0
LBS/CAPITA RECYCLED	36	121	4.7	2.3	0.2	2.0	0.2	0.1	102.7	10.7	1.3	1.3

Data Quality Limited **Data Systems** Basic

NEBRASKA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	39	371	47.9	17.4	4.2	15.7	7.0	3.6	235.2	69.3	8.6	10.2
LBS/CAPITA DISPOSED	22	201	41.6	14.9	4.0	13.1	6.3	3.3	84.5	60.0	7.0	8.1
LBS/CAPITA RECYCLED	18	170	6.3	2.4	0.3	2.6	0.7	0.3	150.6	9.3	1.6	2.1

Data Quality Fair **Data Systems** None

NEVADA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	13	333	45.7	18.8	4.2	11.6	7.0	4.1	221.1	50.0	8.2	7.7
LBS/CAPITA DISPOSED	19	192	40.5	15.7	4.1	9.9	6.8	4.0	100.8	37.4	7.0	6.3
LBS/CAPITA RECYCLED	26	141	5.1	3.0	0.1	1.6	0.2	0.1	120.3	12.6	1.2	1.4

Data Quality Fair **Data Systems** Good

NEW HAMPSHIRE

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	43	380	45.7	17.9	4.2	12.7	7.0	3.8	235.6	81.7	7.8	8.9
LBS/CAPITA DISPOSED	25	207	34.4	12.7	4.0	7.9	6.1	3.6	110.0	50.7	5.4	6.1
LBS/CAPITA RECYCLED	16	173	11.3	5.2	0.2	4.7	0.9	0.3	125.6	31.0	2.5	2.9

Data Quality Limited **Data Systems** None

NEW JERSEY

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	49	394	56.1	24.3	4.2	17.0	7.0	3.5	230.1	74.4	16.1	17.5
LBS/CAPITA DISPOSED	11	148	40.8	18.9	3.8	9.1	5.9	3.0	61.0	32.4	6.4	6.9
LBS/CAPITA RECYCLED	3	247	15.3	5.4	0.4	7.9	1.1	0.5	169.0	42.0	9.7	10.6

Data Quality Fair **Data Systems** Good

NEW MEXICO

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	11	326	45.1	18.8	4.2	11.0	7.0	4.1	215.5	50.0	8.2	7.1
LBS/CAPITA DISPOSED	38	229	41.3	16.8	4.1	9.5	6.9	4.0	132.9	41.1	7.2	6.2
LBS/CAPITA RECYCLED	42	97	3.8	1.9	0.1	1.5	0.2	0.1	82.6	8.9	1.1	0.9

Data Quality Limited **Data Systems** Basic

NEW YORK

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	3	290	56.1	26.1	3.3	14.8	7.1	4.8	155.7	63.5	8.4	6.6
LBS/CAPITA DISPOSED	5	122	37.9	12.1	3.0	11.2	6.8	4.6	56.3	21.3	3.0	3.8
LBS/CAPITA RECYCLED	19	168	18.2	14.0	0.2	3.6	0.3	0.1	99.4	42.2	5.4	2.8

Data Quality Good **Data Systems** Good

NORTH CAROLINA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	18	338	47.8	20.1	4.6	10.9	7.2	5.0	223.1	50.9	7.4	8.7
LBS/CAPITA DISPOSED	13	161	43.9	18.4	4.5	9.1	6.9	5.0	73.5	31.2	6.2	6.3
LBS/CAPITA RECYCLED	14	177	3.8	1.7	0.1	1.8	0.2	0.1	149.5	19.7	1.2	2.4

Data Quality Fair **Data Systems** Good

NORTH DAKOTA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	46	386	47.8	17.4	4.2	15.6	7.0	3.6	250.1	69.3	8.6	10.2
LBS/CAPITA DISPOSED	45	250	41.9	14.8	4.0	12.9	6.8	3.4	153.7	39.7	6.6	7.8
LBS/CAPITA RECYCLED	28	136	5.9	2.6	0.2	2.7	0.3	0.1	96.4	29.7	1.9	2.4

Data Quality Limited **Data Systems** None

OHIO

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	2	265	49.8	20.8	3.7	9.7	8.9	6.7	159.5	39.2	8.4	8.3
LBS/CAPITA DISPOSED	20	193	45.3	18.5	3.6	8.1	8.5	6.5	108.1	26.5	7.1	6.3
LBS/CAPITA RECYCLED	48	72	4.5	2.3	0.1	1.5	0.4	0.2	51.3	12.7	1.3	2.0

Data Quality Good **Data Systems** Good

OKLAHOMA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	15	335	46.5	18.8	4.2	12.4	7.0	4.1	221.8	50.0	8.2	8.6
LBS/CAPITA DISPOSED	39	230	43.1	17.5	4.2	11.1	6.5	3.8	128.5	43.7	7.2	7.4
LBS/CAPITA RECYCLED	40	105	3.4	1.3	0.1	1.3	0.5	0.2	93.3	6.3	1.1	1.2

Data Quality Limited **Data Systems** Basic

OREGON

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	22	341	38.8	9.0	5.0	10.1	8.9	5.8	210.5	73.6	7.5	10.4
LBS/CAPITA DISPOSED	3	111	28.6	2.8	4.9	6.6	8.7	5.6	53.7	20.7	1.1	6.7
LBS/CAPITA RECYCLED	6	230	10.1	6.2	0.1	3.5	0.3	0.1	156.8	53.0	6.4	3.7

Data Quality Good **Data Systems** Good

PENNSYLVANIA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	38	365	50.7	22.4	4.2	13.5	7.0	3.5	233.0	63.2	8.2	9.5
LBS/CAPITA DISPOSED	10	136	40.2	19.4	3.8	8.6	5.4	3.0	53.3	35.2	4.3	2.9
LBS/CAPITA RECYCLED	7	229	10.6	3.1	0.4	5.0	1.6	0.5	179.8	28.0	4.0	6.6

Data Quality Fair **Data Systems** Good

RHODE ISLAND

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	9	318	37.9	15.4	4.2	8.5	6.0	3.8	222.0	42.3	5.0	10.3
LBS/CAPITA DISPOSED	9	132	27.2	9.8	4.0	4.1	5.5	3.6	74.9	22.3	3.1	4.1
LBS/CAPITA RECYCLED	13	186	10.8	5.6	0.2	4.4	0.5	0.2	147.1	20.0	2.0	6.3

Data Quality Good **Data Systems** Good

SOUTH CAROLINA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	26	347	51.1	22.4	4.2	12.1	7.0	5.3	220.6	57.0	9.7	8.3
LBS/CAPITA DISPOSED	33	217	49.1	21.9	4.1	11.4	6.7	5.1	101.2	51.5	8.8	6.9
LBS/CAPITA RECYCLED	30	129	2.0	0.5	0.1	0.7	0.4	0.2	119.5	5.5	1.0	1.4

Data Quality Fair **Data Systems** Good

SOUTH DAKOTA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	35	363	45.8	17.4	4.2	13.6	7.0	3.6	229.8	69.3	8.6	9.5
LBS/CAPITA DISPOSED	35	223	39.7	14.5	4.0	11.0	6.7	3.4	132.6	36.8	6.5	7.1
LBS/CAPITA RECYCLED	27	140	6.1	2.8	0.2	2.6	0.3	0.2	97.2	32.6	2.1	2.4

Data Quality Limited **Data Systems** None

TENNESSEE

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	31	355	47.8	18.8	4.2	13.7	7.0	4.1	227.1	62.5	8.2	9.6
LBS/CAPITA DISPOSED	49	273	45.9	18.1	4.1	12.8	6.8	4.0	153.4	58.1	6.9	8.5
LBS/CAPITA RECYCLED	47	82	1.9	0.6	0.1	0.9	0.2	0.1	73.8	4.4	1.4	1.0

Data Quality Limited **Data Systems** Good

TEXAS

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	6	307	52.4	18.7	3.6	18.1	8.3	3.7	191.9	43.3	9.7	9.9
LBS/CAPITA DISPOSED	29	211	46.9	16.6	3.5	16.0	7.6	3.2	110.6	37.7	8.2	7.6
LBS/CAPITA RECYCLED	44	96	5.5	2.1	0.1	2.1	0.7	0.5	81.3	5.6	1.5	2.3

Data Quality Fair **Data Systems** Basic

UTAH

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	27	347	47.0	18.8	4.2	12.9	7.0	4.1	233.0	50.0	8.2	9.2
LBS/CAPITA DISPOSED	24	205	41.5	16.2	4.0	10.5	6.8	4.0	111.1	37.9	6.8	7.6
LBS/CAPITA RECYCLED	22	143	5.5	2.6	0.2	2.4	0.2	0.1	121.9	12.1	1.4	1.6

Data Quality Limited **Data Systems** Basic

VERMONT

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	8	317	48.8	17.9	6.2	14.2	6.5	3.9	129.5	113.7	11.2	13.7
LBS/CAPITA DISPOSED	4	116	30.8	8.9	6.0	6.6	5.7	3.7	47.2	26.7	3.7	7.1
LBS/CAPITA RECYCLED	11	201	17.9	9.1	0.2	7.6	0.9	0.2	82.3	87.0	7.5	6.6

Data Quality Good **Data Systems** Good

VIRGINIA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	4	300	62.1	22.5	4.5	15.9	12.0	7.3	171.3	48.0	8.7	10.1
LBS/CAPITA DISPOSED	14	171	56.5	20.2	4.4	13.0	11.7	7.2	75.6	26.6	6.7	6.0
LBS/CAPITA RECYCLED	31	129	5.6	2.3	0.1	2.9	0.2	0.1	95.7	21.4	2.0	4.0

Data Quality Good **Data Systems** Basic

WASHINGTON

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	1	262	32.6	11.2	6.0	9.5	3.4	2.5	148.4	67.4	5.9	7.6
LBS/CAPITA DISPOSED	2	102	25.8	8.1	5.8	6.9	2.8	2.3	36.8	31.9	3.2	4.1
LBS/CAPITA RECYCLED	20	160	6.9	3.1	0.2	2.7	0.6	0.3	111.6	35.5	2.7	3.5

Data Quality Good **Data Systems** Good

WEST VIRGINIA

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	23	342	50.7	22.4	4.2	11.7	7.0	5.3	216.8	57.0	9.7	7.8
LBS/CAPITA DISPOSED	42	237	49.6	21.8	4.2	11.2	7.0	5.3	114.9	56.2	9.1	7.2
LBS/CAPITA RECYCLED	41	105	1.1	0.6	0.0	0.5	0.0	0.0	101.9	0.8	0.7	0.6

Data Quality Fair **Data Systems** None

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	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	30	355	50.1	20.8	4.2	12.7	7.0	5.4	224.4	62.5	9.1	8.9
LBS/CAPITA DISPOSED	26	207	39.5	15.9	3.8	7.9	6.8	5.2	135.0	22.2	6.6	3.5
LBS/CAPITA RECYCLED	21	148	10.7	4.9	0.4	4.8	0.3	0.2	89.4	40.3	2.4	5.4

Data Quality Fair **Data Systems** Good

WYOMING

	Rank	Overall Lbs/ Capita	Plastics Total	PET Bottles	PET Other Rigid	HDPE Bottles	PP	Rigids #3-7	Cardboard/ Boxboard	Glass Bottles and Jars	Aluminum Cans	Steel Cans
LBS/CAPITA GENERATED	14	333	45.8	18.8	4.2	11.7	7.0	4.1	221.5	50.0	8.2	7.9
LBS/CAPITA DISPOSED	30	214	41.2	16.5	4.0	9.8	6.8	4.0	120.0	39.4	7.0	6.7
LBS/CAPITA RECYCLED	37	119	4.6	2.3	0.2	1.9	0.2	0.1	101.5	10.6	1.3	1.2

Data Quality Limited **Data Systems** None

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