



# 50 STATES OF RECYCLING 2.0

A State-by-State Assessment of 2021  
Containers and Packaging Recycling Rates  
December 2023



# Building on the Analysis from the First Report

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In 2021, Eunomia Research & Consulting and the Ball Corporation released the inaugural edition of the 50 States of Recycling Report, a first-of-its-kind state-by-state comparable assessment of common packaging materials based on 2018 data. This calculation set a baseline in each state that can be used to inform policy, design programs, and assess infrastructure needs.

## The 50 States of Recycling 2.0 Provides:

- Updated Data and Rankings of State Recycling Rates by Material Type
- Analysis of the economic, social, and environmental impacts of both current recycling rates and possible optimal recycling rates
- Models the potential impact of recycling policies including:
  - Modernized Recycling Refunds (also known as Deposit Return Systems or Bottle Bills) in the Northeast
  - Performance of EPR Only vs. EPR +Recycling Refunds in two states- Washington and Colorado.

We hope this data and analysis will help equip policy makers and industry partners with the information needed to maximize economic, social, and environmental outcomes.

# BUILDING ON THE COMPARABLE STATE-BY-STATE RECYCLING RATE FOR CONTAINERS AND PACKAGING WE CREATED IN 2021

The 50 States of Recycling 2.0 provides an update to this analysis, the state recycling rankings are based on the recycling rate of packaging materials minus cardboard, boxboard, paper packaging, plastic films, and flexible plastic packaging – referred to as fiber and flexible plastics (FFP).

While the recycling of these materials is important, their large volumes -- 66% of the total weight of packaging analyzed – they mask the performance of other packaging materials. In addition to volume, much of this material comes from the commercial sector from which the data is less accurate.



# 50 STATES 2.0: KEY TAKEAWAYS

On average, recycling rates across states have stagnated and some of the largest shifts between 2018 and 2021 are the result of the inclusion of new and more accurate data released since 2018. **This shows the need for continued action to improve U.S. recycling systems.**

Collection and recycling are not synonymous.



We must measure real recycling and prioritize the recycling of high value materials instead of collecting non-recyclable contaminants that make the entire system less effective.

Closed loop recycling maximizes recycling benefits. States with Recycling Refunds (RR) (also known as bottle bills & deposit return systems) have significantly higher closed loop recycling rates than non-RR States.



We must prioritize the closed loop recycling. Keeping materials in use for as long as possible maximizes social, environmental, and economic benefits. RR states recycle 34% of material packaging through closed-loop end markets compared to 7% for non-RR states.

Increasing recycling rates can support the fight against climate change and unlock economic potential.



Recycling results in the avoidance of over 79 million MTCO<sub>2</sub>e in the US annually.

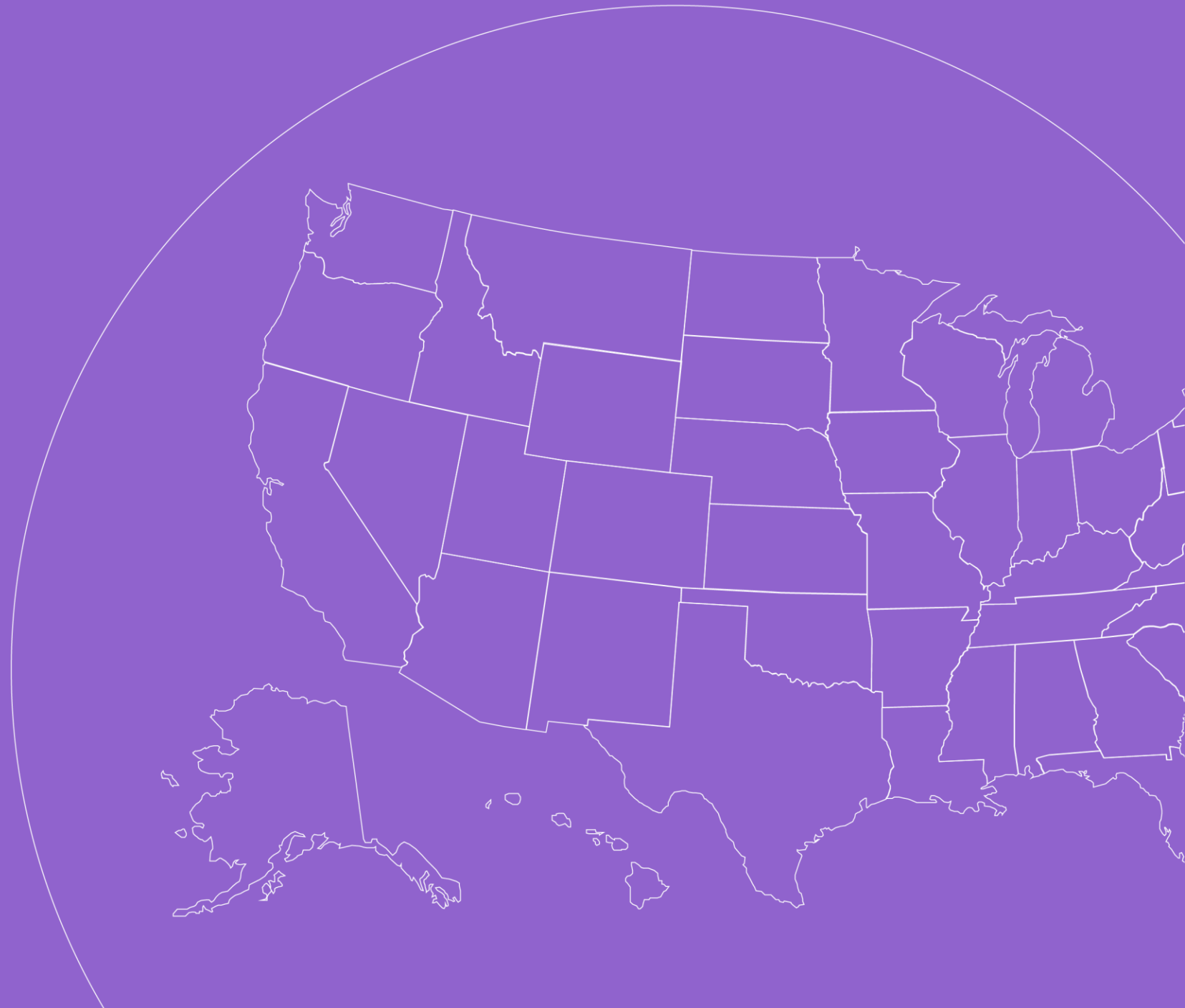
U.S. recycling industry only captures about 32% of the total value of material in the packaging waste stream.

When implemented together well-designed Extended Producer Responsibility (EPR) and Recycling Refunds (RR) will accelerate the implementation and the ability to achieve higher recycling rates within a shorter period.



Policymakers at the state and federal level must prioritize enacting well-design EPR +RR recycling policy and legislation together to deliver the best social, environmental, and economic outcomes.

# Rankings



THE 50  
STATES OF  
RECYCLING

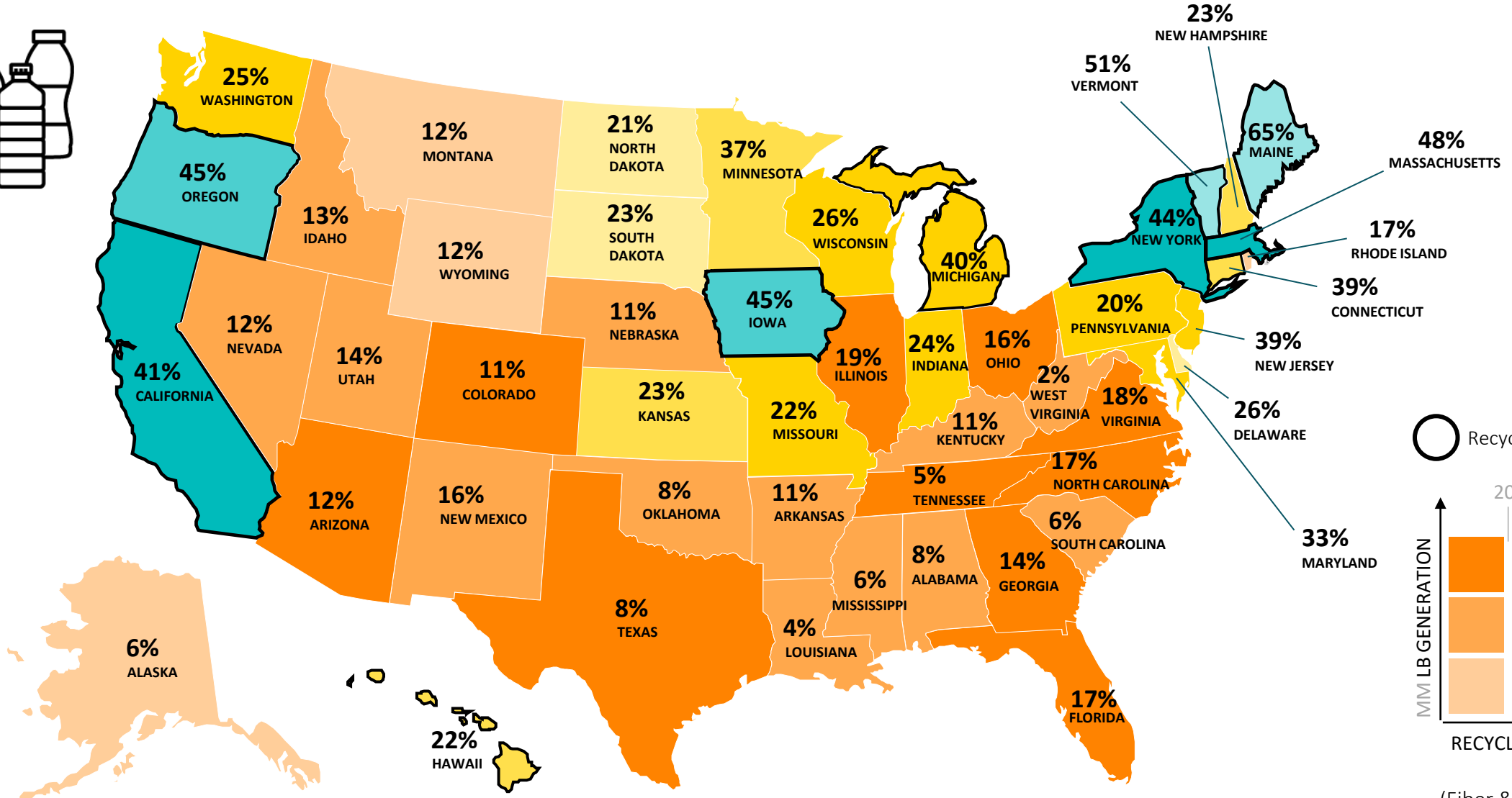
# STATE RECYCLING RANKINGS: EXCLUDES FIBER & FLEXIBLE PLASTICS

## TOP 10 & BOTTOM 10

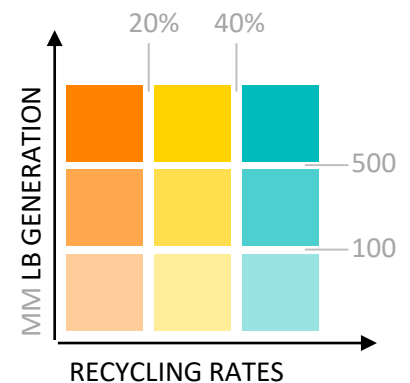


RANKING: TOP 10	STATE	RECYCLING RATE	RECYCLING REFUND	RANKING: BOTTOM 10	STATE	RECYCLING RATE	RECYCLING REFUND
#1	Maine	65%	Yes	#41	Colorado	11%	No
#2	Vermont	51%	Yes	#42	Texas	8%	No
#3	Massachusetts	48%	Yes	#43	Alabama	8%	No
#4	Iowa	45%	Yes	#44	Oklahoma	8%	No
#5	Oregon	45%	Yes	#45	Mississippi	6%	No
#6	New York	44%	Yes	#46	South Carolina	6%	No
#7	California	41%	Yes	#47	Alaska	6%	No
#8	Michigan	40%	Yes	#48	Tennessee	5%	No
#9	New Jersey	39%	No	#49	Louisiana	4%	No
#10	Connecticut	39%	Yes	#50	West Virginia	2%	No

# US PACKAGING RECYCLING RATES BY STATE (EXCLUDES FIBER & FLEXIBLE PLASTICS)



○ Recycling Refund State



\*Excludes FFP (Fiber & Flexible Plastics)

# STATE RECYCLING RANKINGS: BEVERAGE CONTAINERS\*

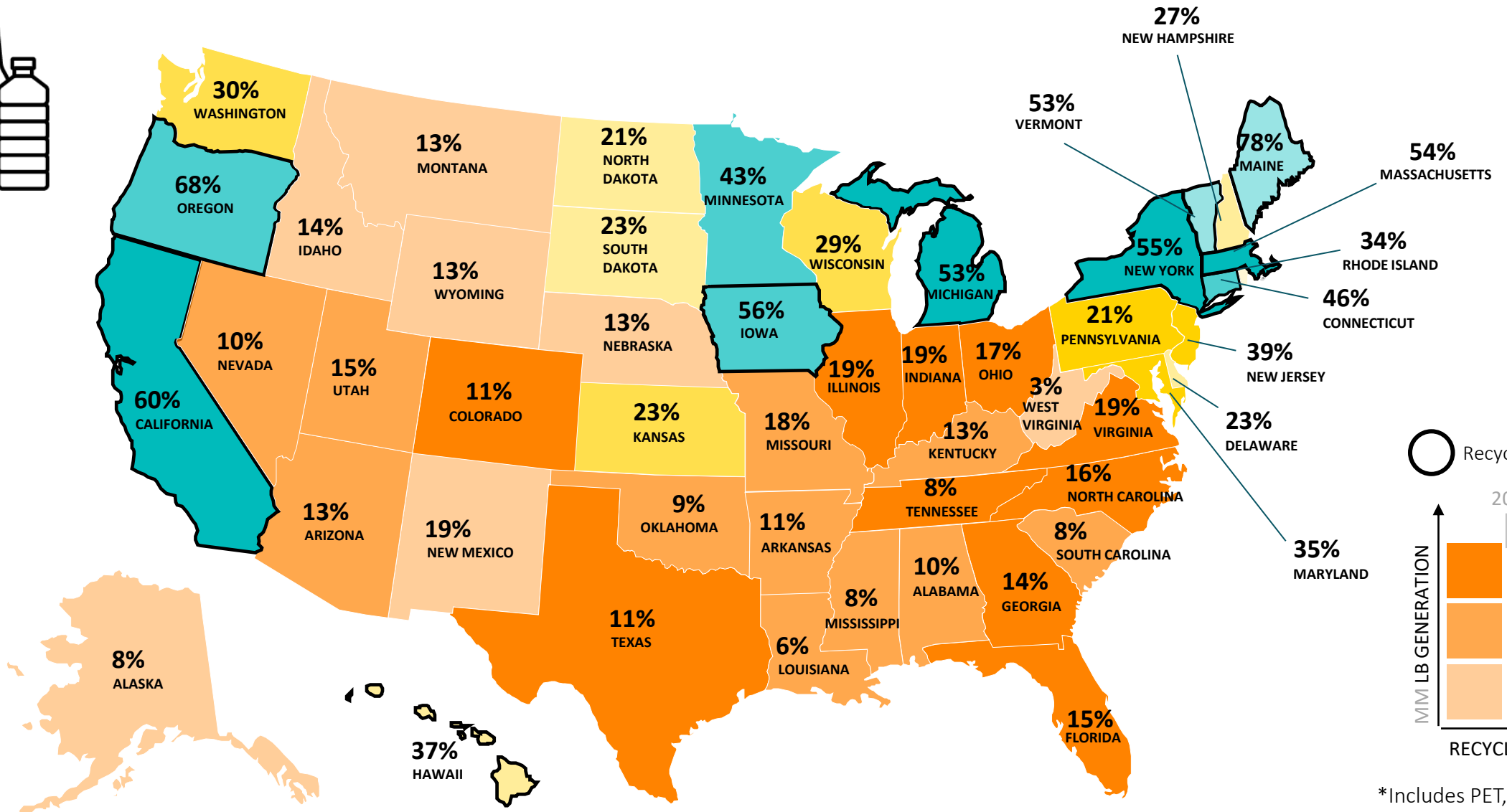
## TOP 10 & BOTTOM 10



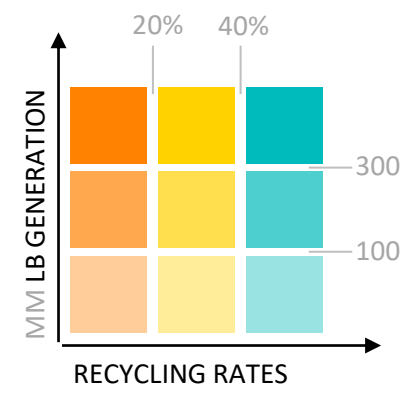
RANKING: TOP 10	STATE	RECYCLING RATE	RECYCLING REFUND	RANKING: BOTTOM 10	STATE	RECYCLING RATE	RECYCLING REFUND
#1	Maine	78%	Yes	#41	Texas	11%	No
#2	Oregon	68%	Yes	#42	Nevada	10%	No
#3	California	60%	Yes	#43	Alabama	10%	No
#4	Iowa	56%	Yes	#44	Oklahoma	9%	No
#5	New York	55%	Yes	#45	Tennessee	8%	No
#6	Massachusetts	54%	Yes	#46	Mississippi	8%	No
#7	Vermont	53%	Yes	#47	Alaska	8%	No
#8	Michigan	53%	Yes	#48	South Carolina	8%	No
#9	Connecticut	46%	Yes	#49	Louisiana	6%	No
#10	Minnesota	43%	No	#50	West Virginia	3%	No



# US BEVERAGE CONTAINERS\* RECYCLING RATES BY STATE



○ Recycling Refund State



\*Includes PET, Aluminum, Glass  
 \*Includes both glass bottles & jars together

# STATE RECYCLING RANKINGS: ALUMINUM CANS

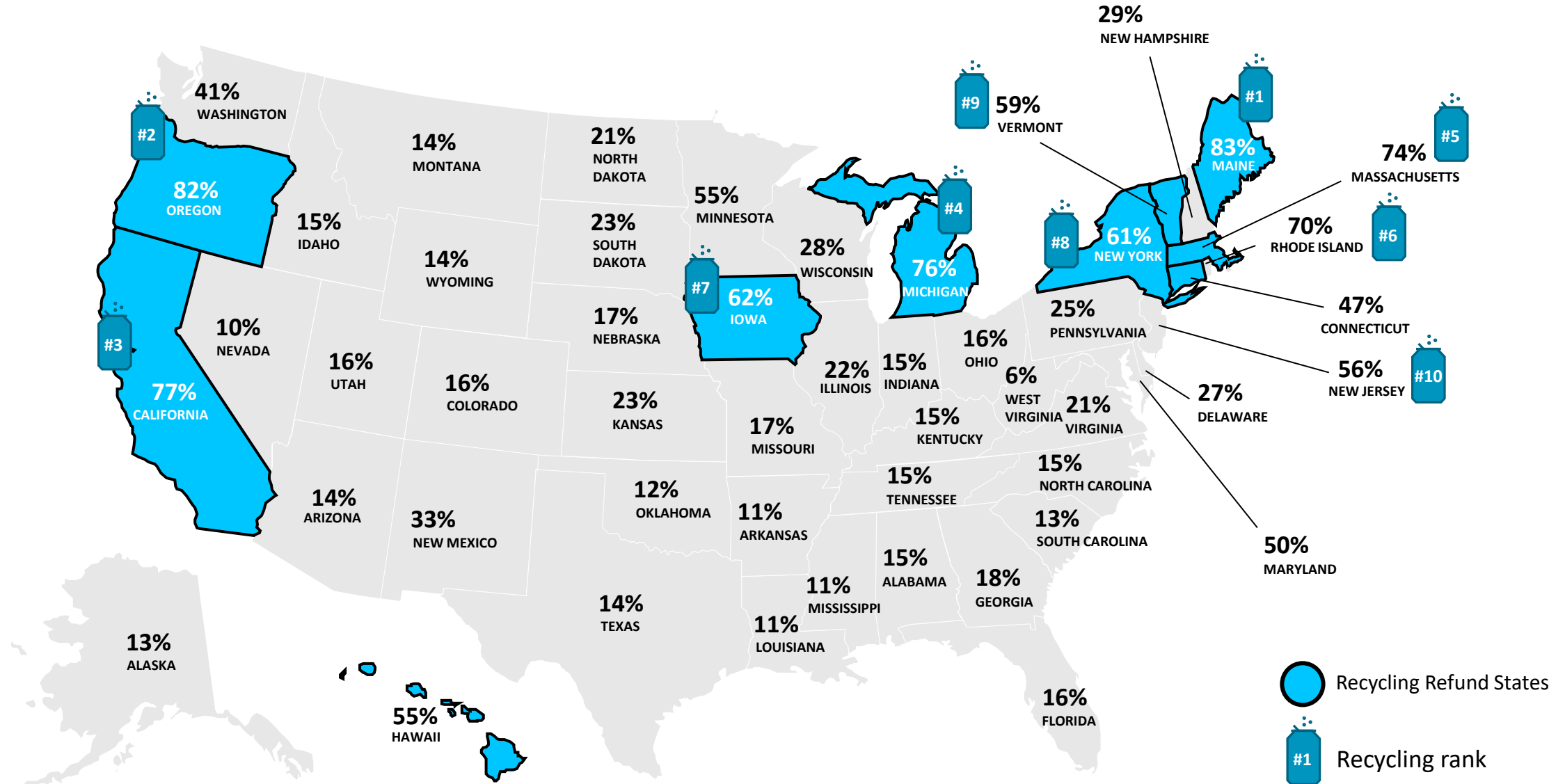
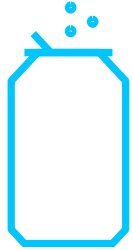
## TOP 10 & BOTTOM 10



RANKING: TOP 10	STATE	RECYCLING RATE	RECYCLING REFUND	RANKING: BOTTOM 10	STATE	RECYCLING RATE	RECYCLING REFUND
#1	Maine	<b>83%</b>	Yes	#41	Wyoming	<b>14%</b>	No
#2	Oregon	<b>82%</b>	Yes	#42	Arizona	<b>14%</b>	No
#3	California	<b>77%</b>	Yes	#43	South Carolina	<b>13%</b>	No
#4	Michigan	<b>76%</b>	Yes	#44	Alaska	<b>13%</b>	No
#5	Massachusetts	<b>74%</b>	Yes	#45	Oklahoma	<b>12%</b>	No
#6	Rhode Island	<b>70%</b>	Yes	#46	Arkansas	<b>11%</b>	No
#7	Iowa	<b>62%</b>	Yes	#47	Mississippi	<b>11%</b>	No
#8	New York	<b>61%</b>	Yes	#48	Louisiana	<b>11%</b>	No
#9	Vermont	<b>59%</b>	Yes	#49	Nevada	<b>10%</b>	No
#10	New Jersey	<b>56%</b>	No	#50	West Virginia	<b>6%</b>	No



# US ALUMINUM CAN RECYCLING RATES BY STATE



# STATE RECYCLING RANKINGS: PET BOTTLES

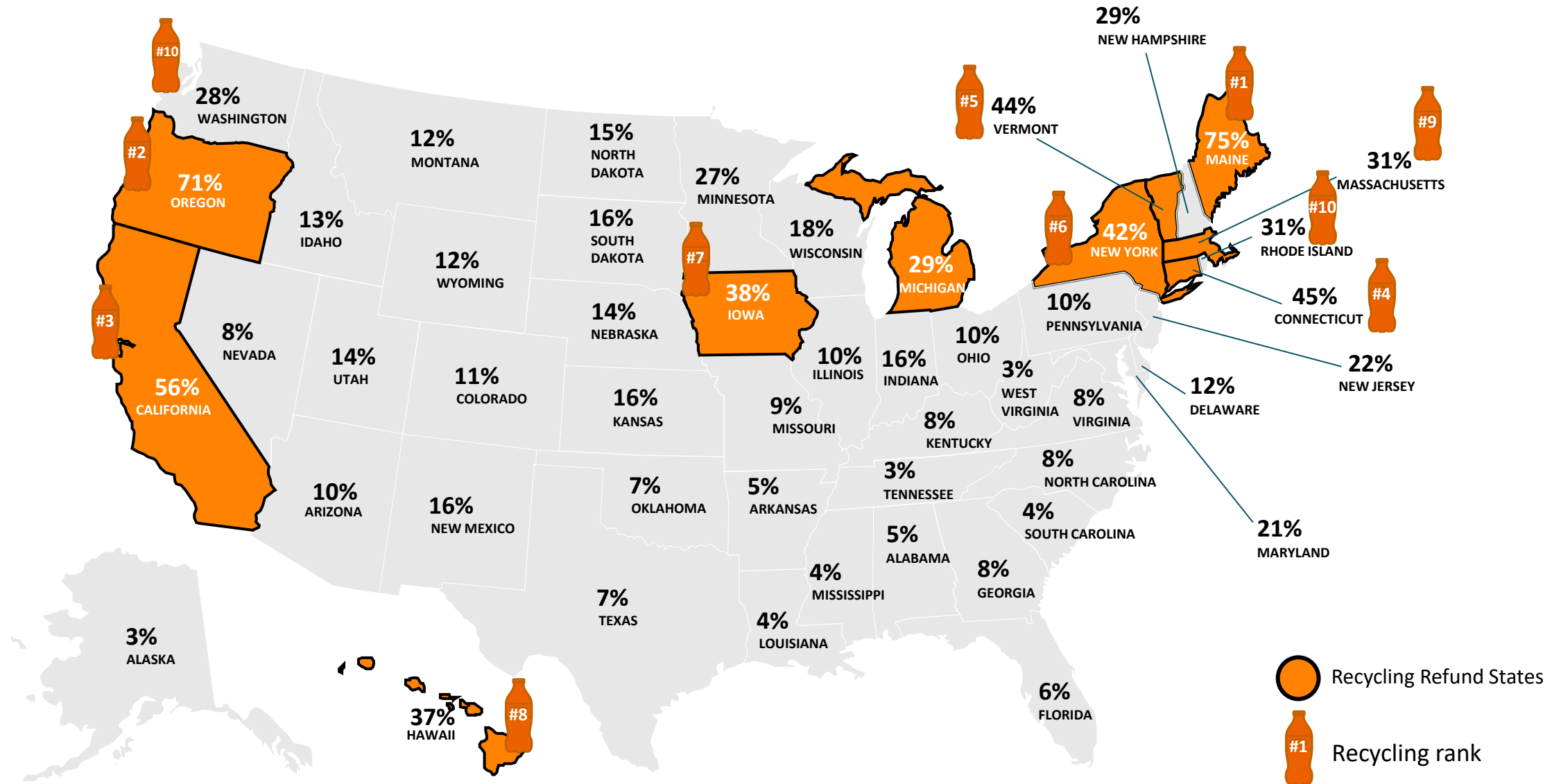
## TOP 10 & BOTTOM 10



RANKING: TOP 10	STATE	RECYCLING RATE	RECYCLING REFUND	RANKING: BOTTOM 10	STATE	RECYCLING RATE	RECYCLING REFUND
#1	Maine	75%	Yes	#41	Oklahoma	7%	No
#2	Oregon	71%	Yes	#42	Florida	6%	No
#3	California	56%	Yes	#43	Alabama	5%	No
#4	Connecticut	45%	Yes	#44	Arkansas	5%	No
#5	Vermont	44%	Yes	#45	Mississippi	4%	No
#6	New York	42%	Yes	#46	Louisiana	4%	No
#7	Iowa	38%	Yes	#47	South Carolina	4%	No
#8	Hawaii	37%	Yes	#48	Alaska	3%	No
#9	Massachusetts	31%	Yes	#49	Tennessee	3%	No
#10	Washington	28%	No	#50	West Virginia	3%	No



# US PET BOTTLES RECYCLING RATES BY STATE



# STATE RECYCLING RANKINGS: GLASS BOTTLES AND JARS

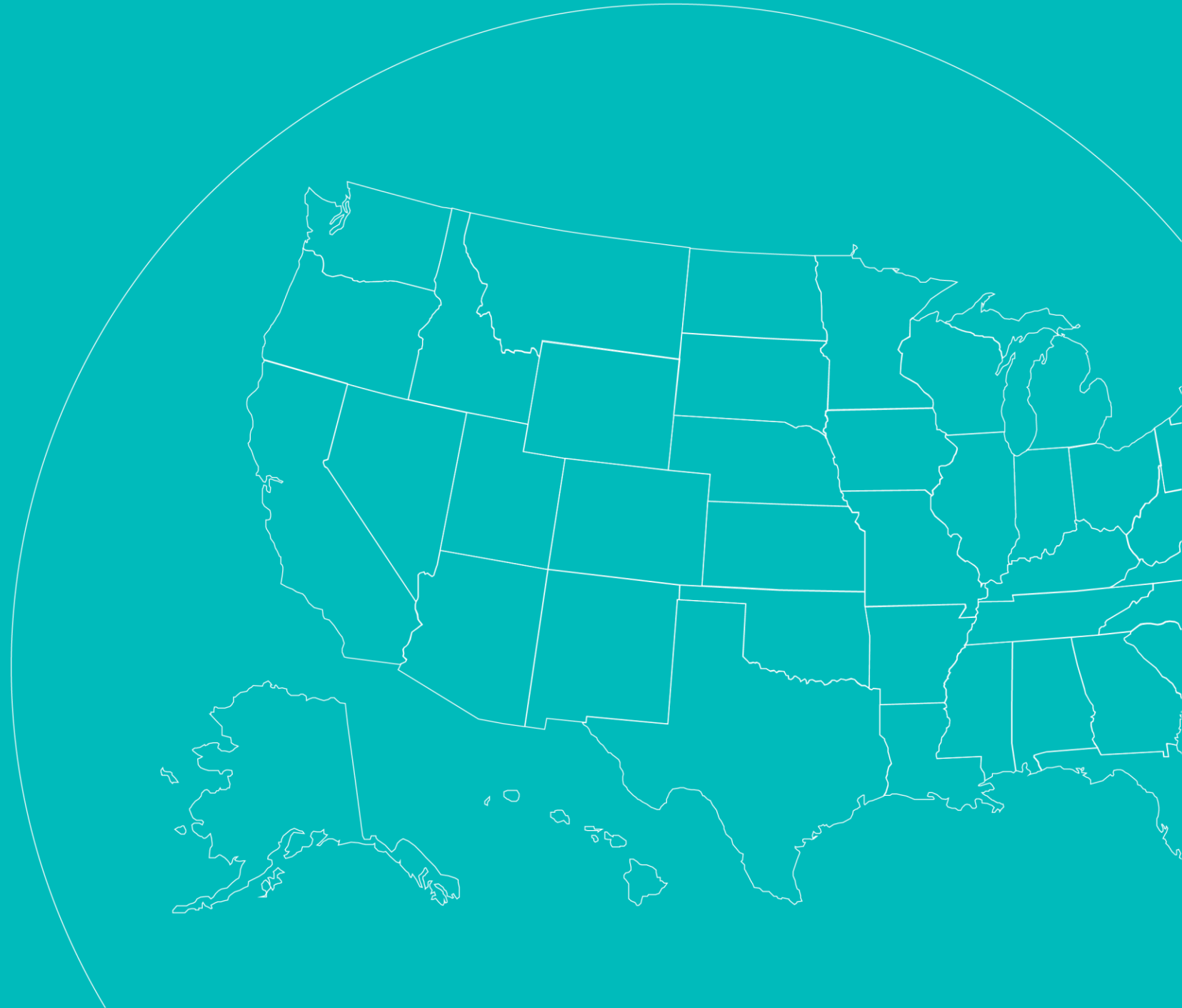
## TOP 10 & BOTTOM 10



RANKING: TOP 10	STATE	RECYCLING RATE	RECYCLING REFUND	RANKING: BOTTOM 10	STATE	RECYCLING RATE	RECYCLING REFUND
#1	Maine	76%	Yes	#41	Nebraska	9%	No
#2	Iowa	68%	Yes	#42	New Mexico	9%	No
#3	New York	61%	Yes	#43	Oklahoma	8%	No
#4	Vermont	57%	Yes	#44	Mississippi	8%	No
#5	Massachusetts	57%	Yes	#45	Alaska	7%	No
#6	Michigan	53%	Yes	#46	South Carolina	5%	No
#7	Oregon	51%	Yes	#47	Tennessee	5%	No
#8	California	49%	Yes	#48	Louisiana	2%	No
#9	Minnesota	46%	No	#49	West Virginia	1%	No
#10	Connecticut	45%	Yes	#50	Rhode Island	0%	No



# Impact Analysis



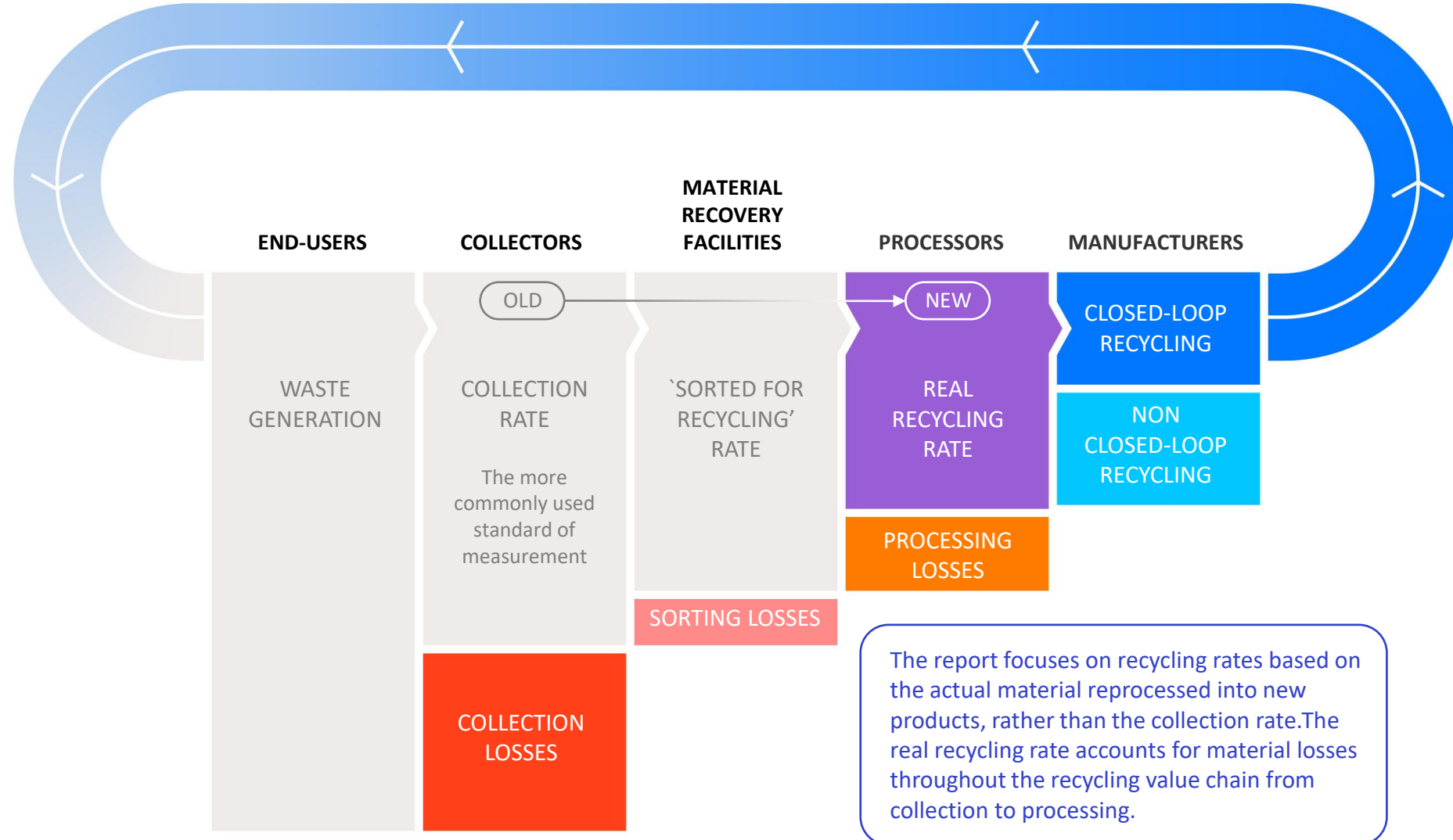
THE 50  
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# THE REAL RECYCLING RATE MEASURES THE QUANTITY OF MATERIAL THAT IS ACTUALLY RECYCLED AND RE-INCORPORATED INTO A NEW PRODUCT

Collection and recycling are not synonymous, as the quantity of material collected for recycling today is often greater than what is actually processed and recycled into new products. The **real recycling** rate measures the quantity of material that is **actually recycled** and re-incorporated into a new product. All recycling rates presented in this report are the real recycling rate.

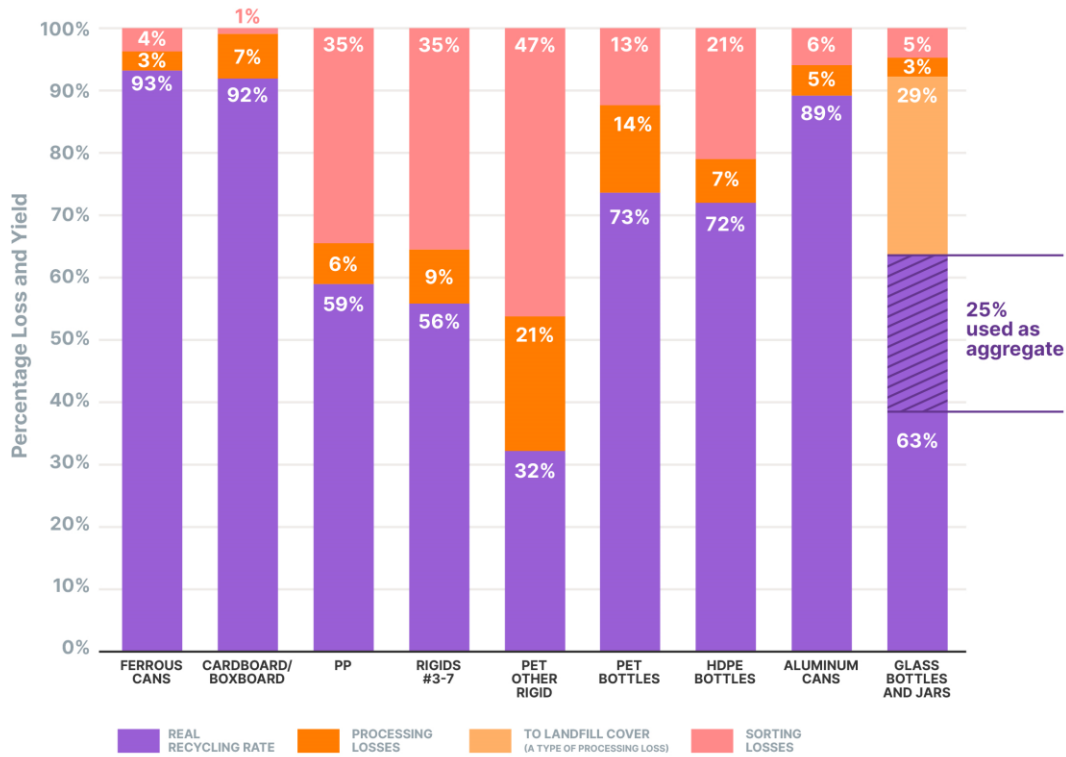
It is only when a recycled material makes it into a new product that we begin to obtain environmental benefit to offset the impacts of the collection, sorting and recycling processes.



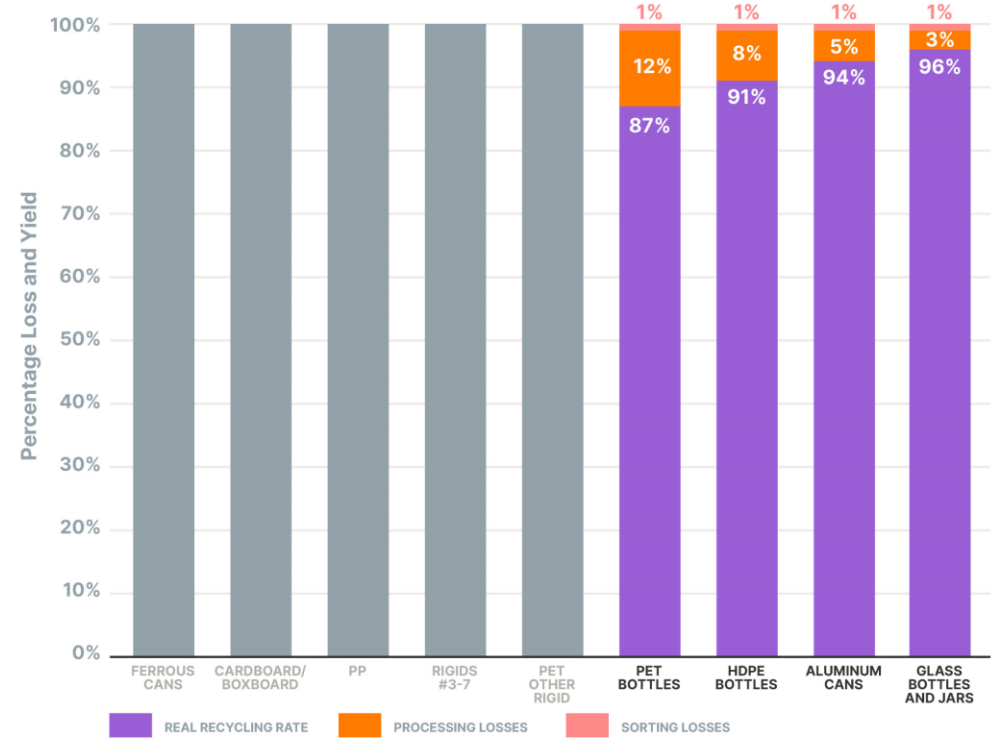
# MATERIAL LOSS RATES UNDER DIFFERENT COLLECTION MODALITIES

The real recycling rate accounts for material losses throughout the recycling value chain from collection to processing. The graph on the left details losses for material collected through single stream systems. The difference between the collection rate and recycling rate for different packaging types varies. While the graph on the right outlines the reduced material losses in an RR system.

### Material Loss Rates Through Single Stream Recycling



### Material Loss Rates Through RR Collection



# RECYCLING PRESERVES THE VALUE OF MATERIALS

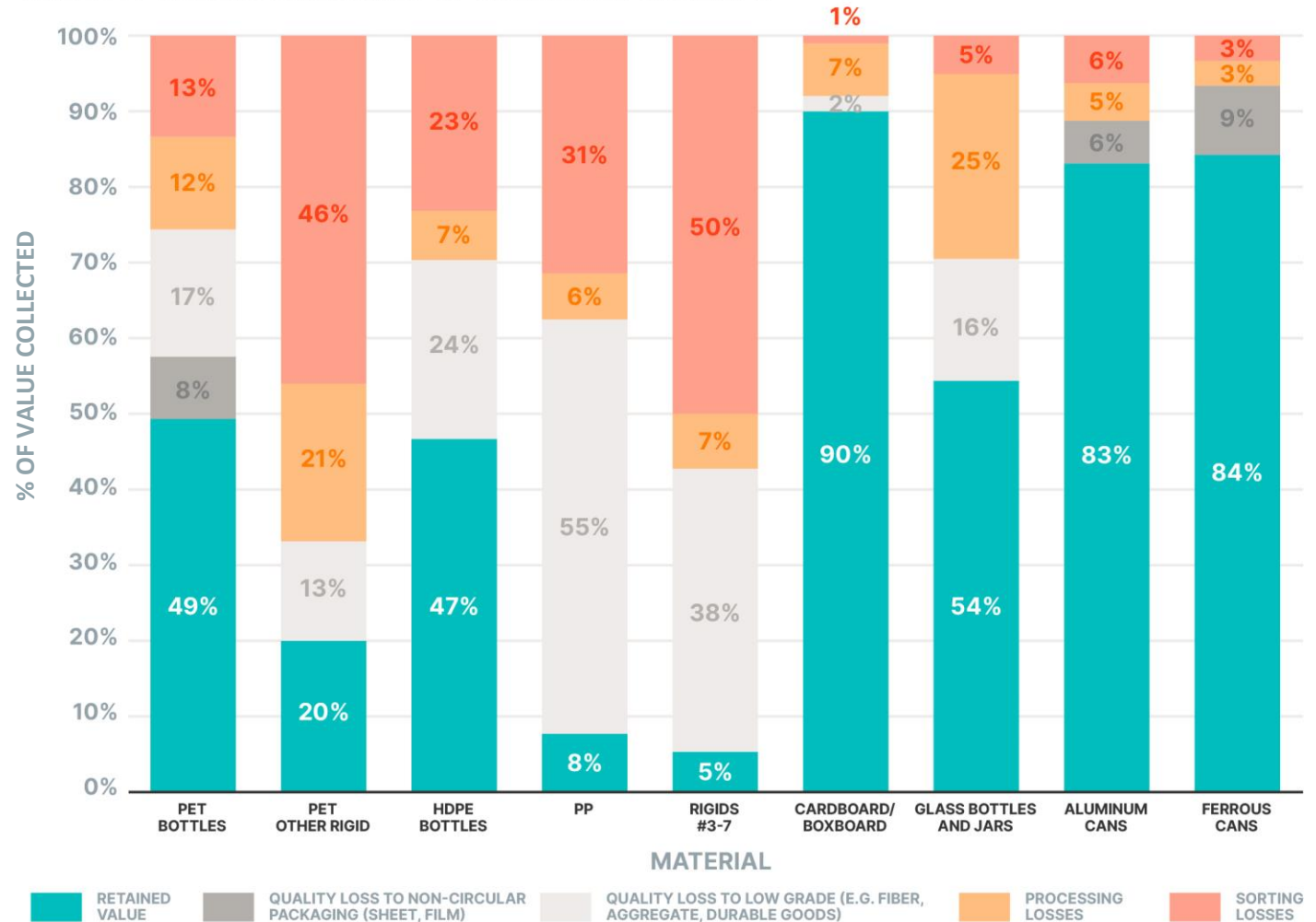
Since not all material is recycled in a closed-loop and large volumes of material go to recycling applications that limit the ability of the material to be recycled again.

Much of this non-closed-loop recycling has a lower monetary value than closed-loop recycling.

For example, PET bottles recycled into pellets that can be reincorporated into new bottles are more valuable than PET fiber. Only 49% of the total value of collected PET Bottles is preserved.

- 13% is lost to sorting
- 12% is lost to processing losses
- 8% lost to non-circular packaging
- 17% is lost due to a very high proportion of the material being recycled into lower-valued non packaging applications.

VALUE OF MATERIAL RETAINED OF COLLECTED MATERIAL



THE 50 STATES OF RECYCLING

# CLOSED LOOP RECYCLING

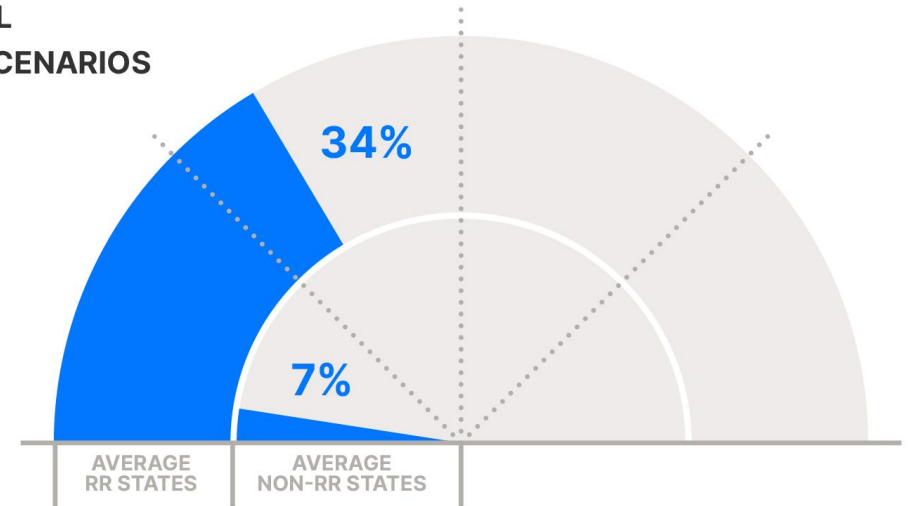
A closed-loop system enables materials to not only be collected and repurposed once but channeled back into systems multiple times.

Currently less than 20% of all packaging waste (not including FFP) generated in the U.S. is of sufficient quality to be recycled through closed loop processes.

RR states recycle more material in a closed loop than non-RR states.

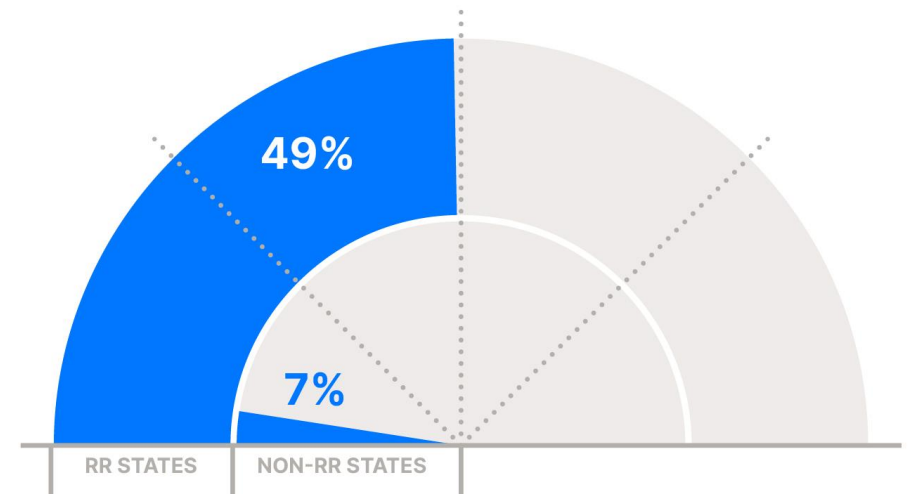
## CLOSED LOOP RECYCLING RATES FOR ALL PACKAGING UNDER DIFFERENT POLICY SCENARIOS

● CLOSED LOOP RECYCLING RATES WITHOUT FFP

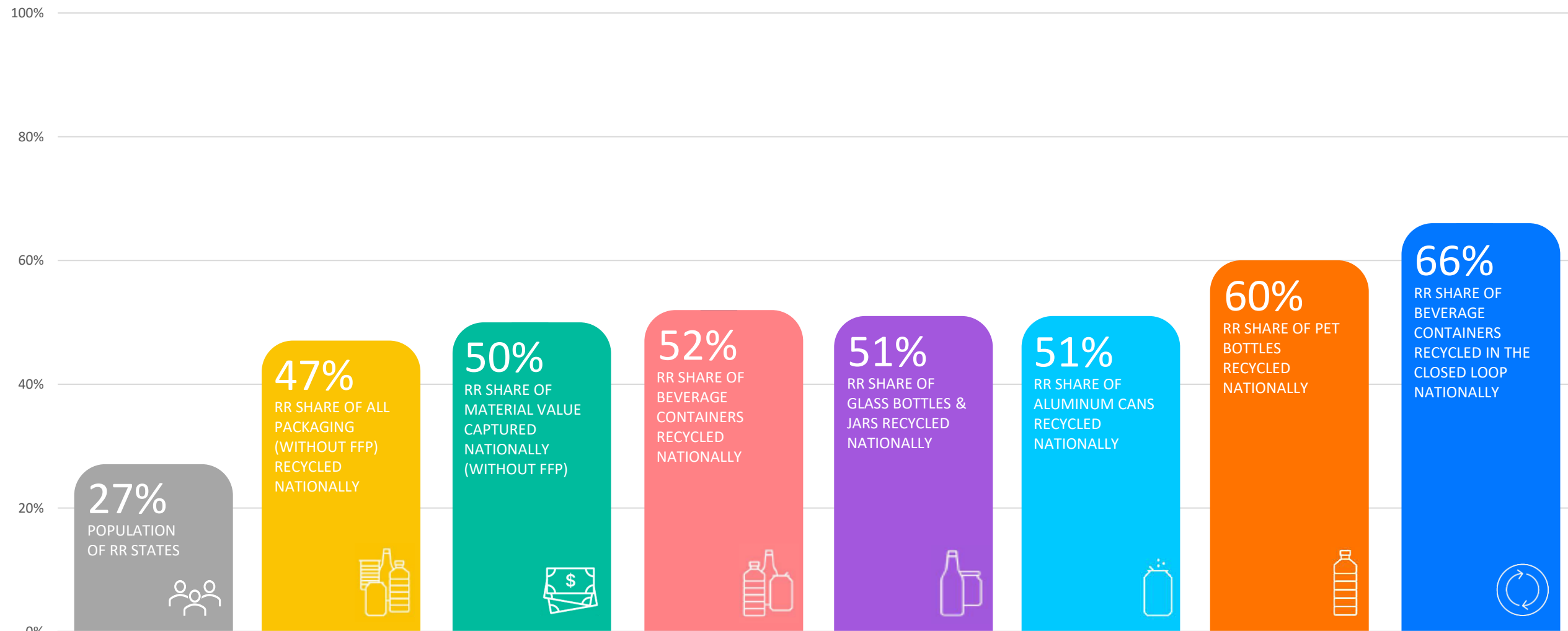


## CLOSED-LOOP RECYCLING RATE FOR BEVERAGE CONTAINER PACKAGING

● CLOSED LOOP



# THE 10 STATES WITH RECYCLING REFUNDS REPRESENT...

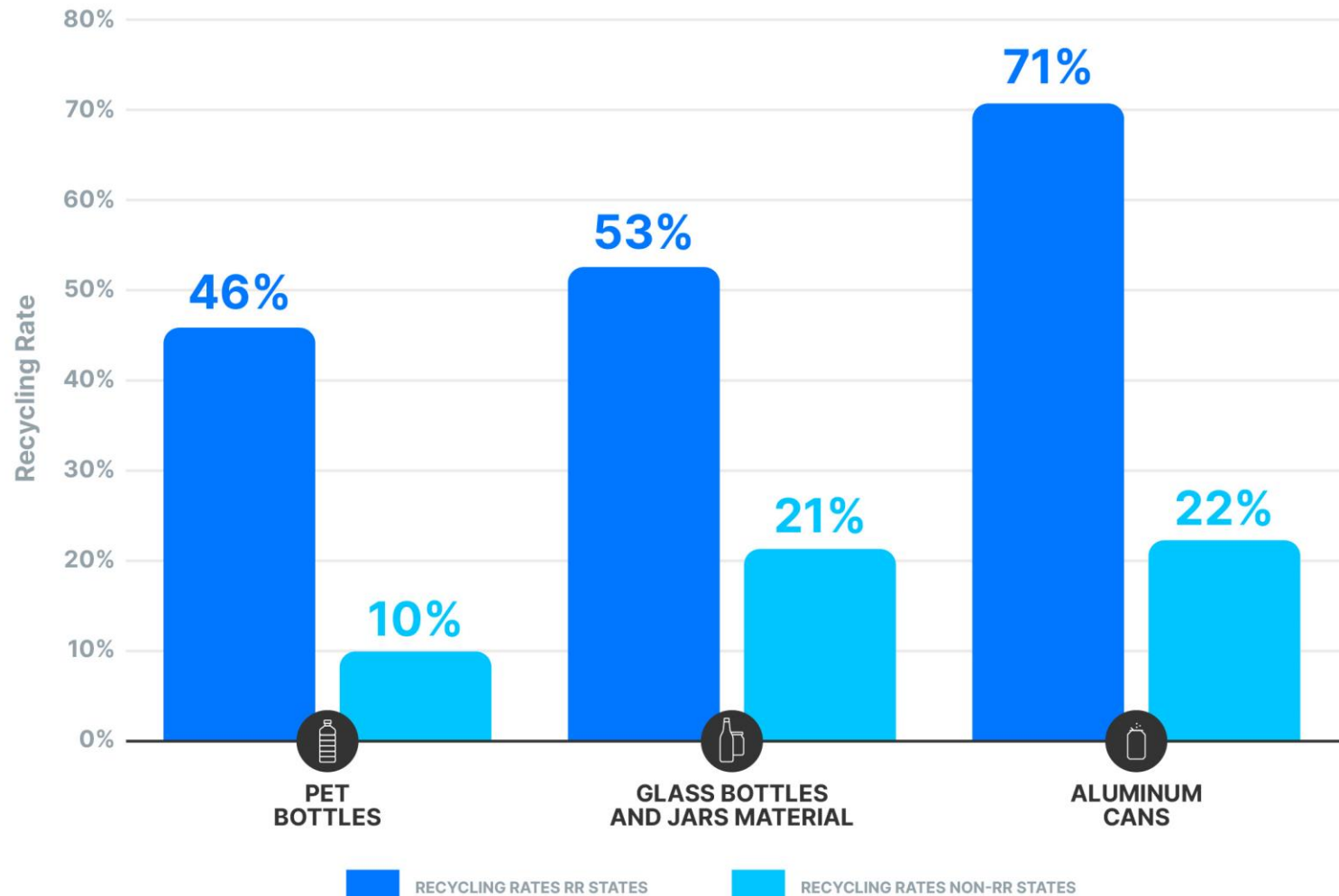


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# COMPARED BEVERAGE CONTAINER RECYCLING RATES IN RR STATES VS. NON-RR STATES

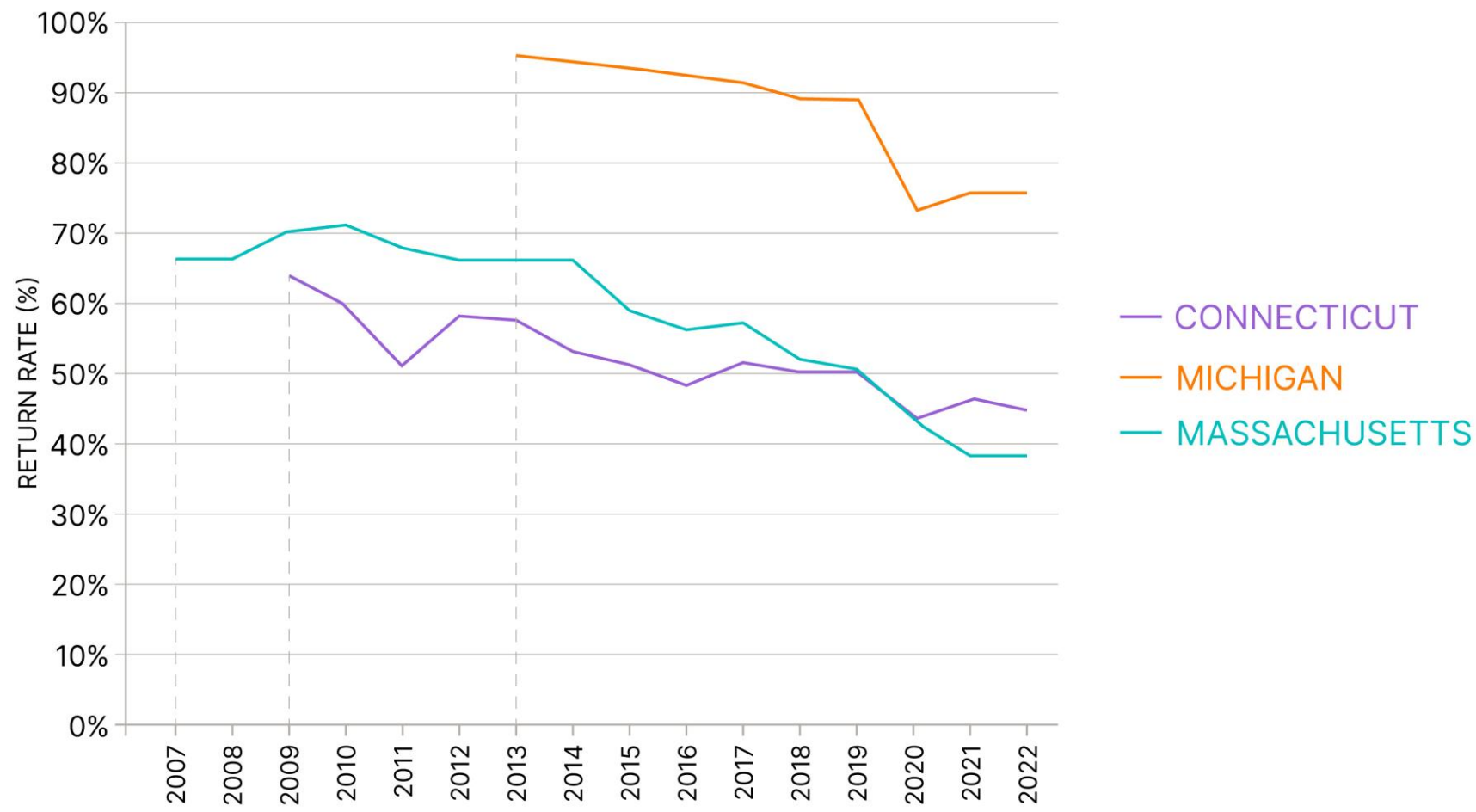
States with recycling refunds achieve much higher recycling rates for beverage containers than states without

BEVERAGE CONTAINER RECYCLING RATES IN RR STATES VS. NON-RR STATES

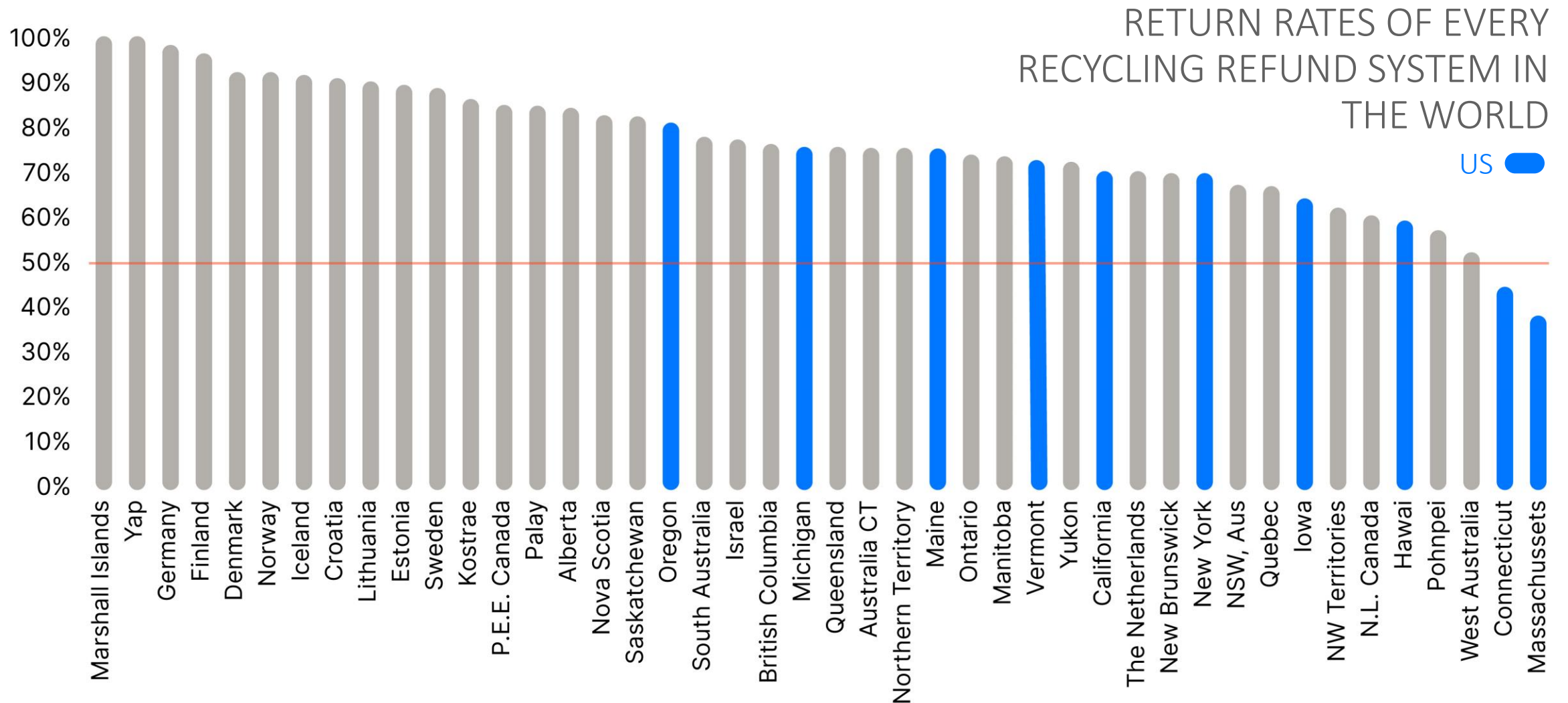


THE 50 STATES OF RECYCLING

# REDEMPTION RATES IN RECYCLING REFUND STATES HAVE DECREASED OVER TIME. MODERNIZATION AND HARMONIZATION IS NEEDED



# US RECYCLING REFUND STATES STILL HAVE PLENTY OF OPPORTUNITIES TO CATCH UP AGAINST WORLD'S BENCHMARKS





# WHILE RR STATES PERFORM WELL MODERNIZATION IS NEEDED: THE NEED TO EXPAND TO INCLUDE NEARLY ALL BEVERAGE CONTAINERS

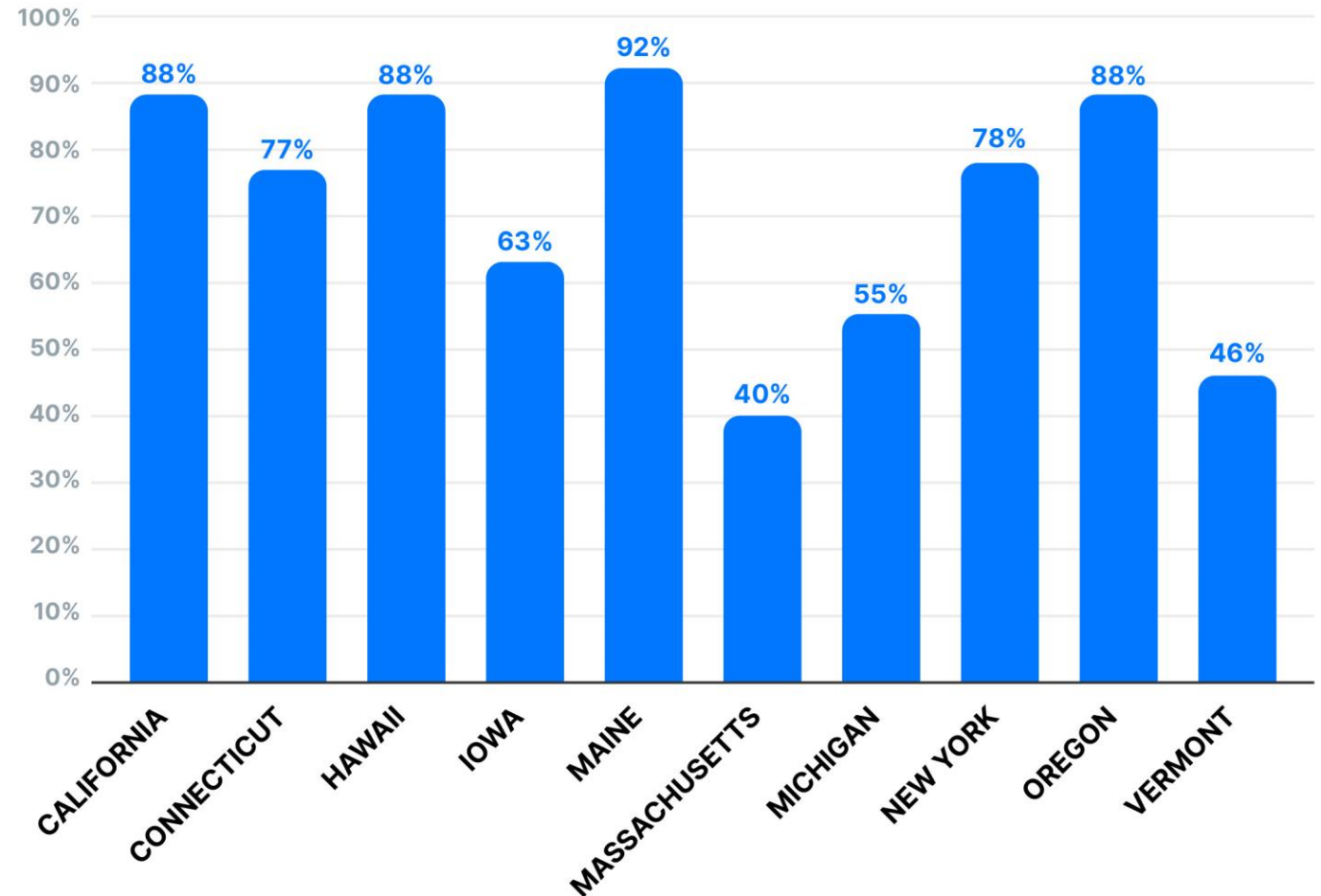
While RR states achieve higher recycling rates in Non-RR States – it's important to recognize these programs need to be modernized

Most RR states only place a deposit on a portion of the beverages put onto the market.

**MICHIGAN:** While Michigan boasts an 88% redemption rate the deposit only applies to carbonated beverages (only 55% of the beverages put onto the market)

Expanding RR programs to cover nearly all beverages and types of beverage containers will lead to improved recycling rates overall

PERCENT OF BEVERAGE UNITS SOLD THAT ARE COVERED BY RECYCLING REFUNDS IN EACH STATE



# CHARACTERISTICS OF A MODERNIZED AND HIGH PERFORMING RECYCLING REFUNDS PROGRAM



Include All Beverage Containers of All Sizes and Formats



Allow Beverage Producers to Operate and Finance a Centralized System



Incentivize Return by Offering Meaningful Consumer Refund



Set a Minimum Return Rate of 90% for All Beverage Packaging.



Reinvest Unredeemed Deposits in the Recycling System



## Create Consumer-Driven and Convenient Return Points

### COMBINING RR AND EPR FOR EXTRA CONVENIENCE

British Columbia (Canada) empowers producers to design and manage different EPR programs specific to their products creating a high performing, holistic recycling system with drop-off sites where consumers can return all different items: beverage containers, commingled recyclables, batteries, textiles, electronics, etc.

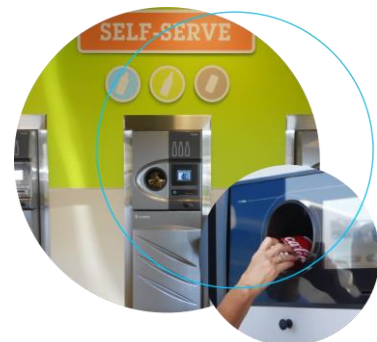


### RR WITH BAG DROPS / EXPRESS RETURN

Several programs in North America operate an express / bag drop system where consumers can return mixed empty containers in a tagged bag that is then sent to a counting center and the refund is paid directly to their account after a few days.

### RR WITH ON-THE-GO 'DONATION'

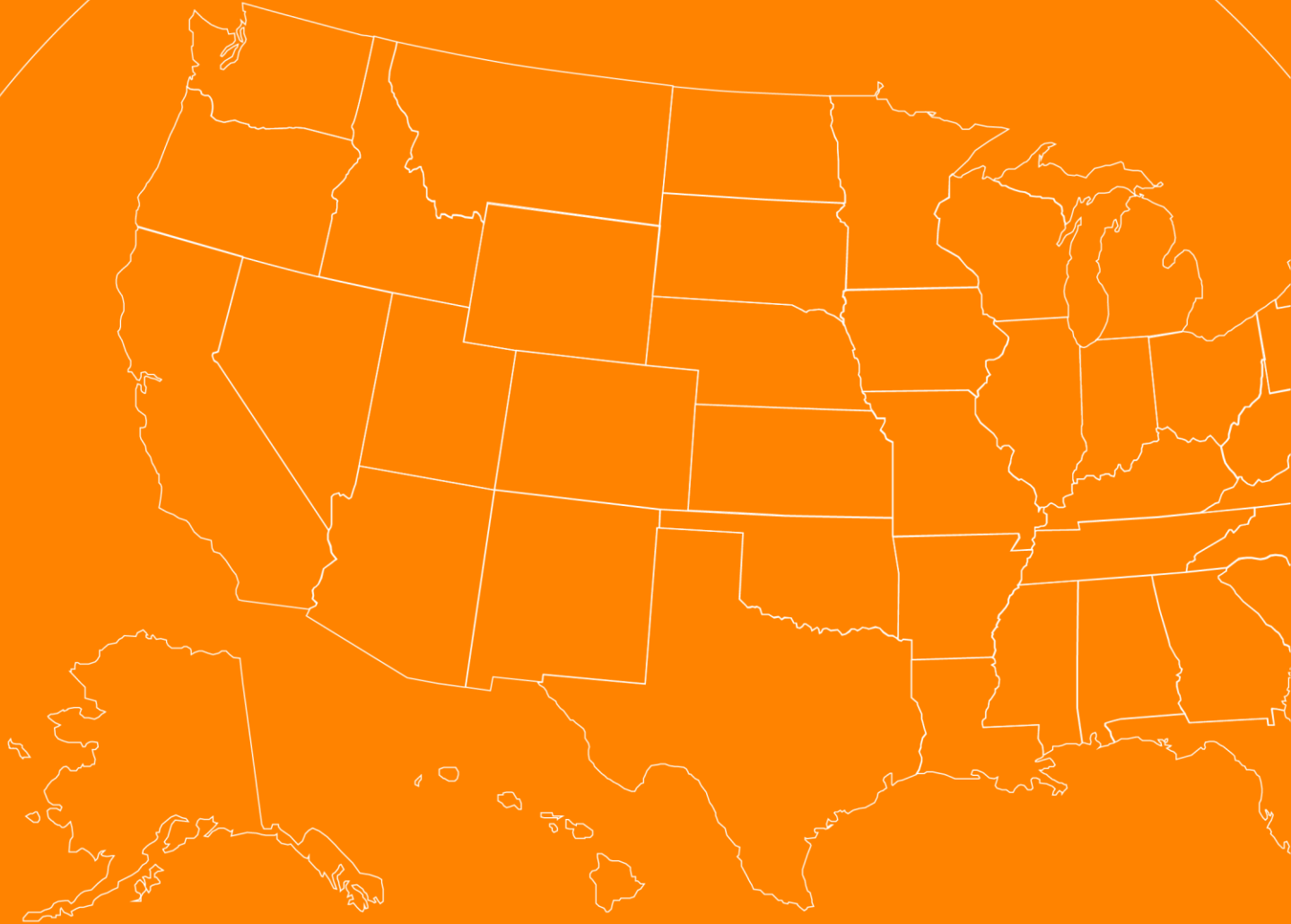
An efficient way to overcome the lack of on-the-go return points in modern RR is through the adoption of collection 'pockets' outside general waste bins where refund-bearing packaging can be disposed of and easily spotted by individuals interested in collecting the deposit without requiring them to go through the bin.



### HIGH VOLUME SELF-SERVICE REDEMPTION POINTS

Support individuals who collect refund bearing containers for income. For example, canners/binners collect cans and bottles from trash cans and from being littered in the environment. These individuals generally rely on same day refunds for their returns and benefit from high volume redemption points/depots.

# 50 States of Recycling 2.0: Case Studies



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# STATE POLICY CASE STUDIES

## MODERNIZING POLICIES TO MATCH BEST IN CLASS RR:

**Impact Assessment in the Northeast:** This analysis illustrates the impact of modernizing these RR based on best-in-class principles to maximize beverage containers recycled, create program efficiencies, while increasing the convenience for program participation. (ME, VT, NY, MA, CT)

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## WASHINGTON STATE:

### Impact of Extended Producer Responsibility + Recycling

**Refunds:** Washington state has proposed, but not yet passed EPR with RR. This analysis compares the performance of implementing EPR alone vs. implementing EPR and RR together.

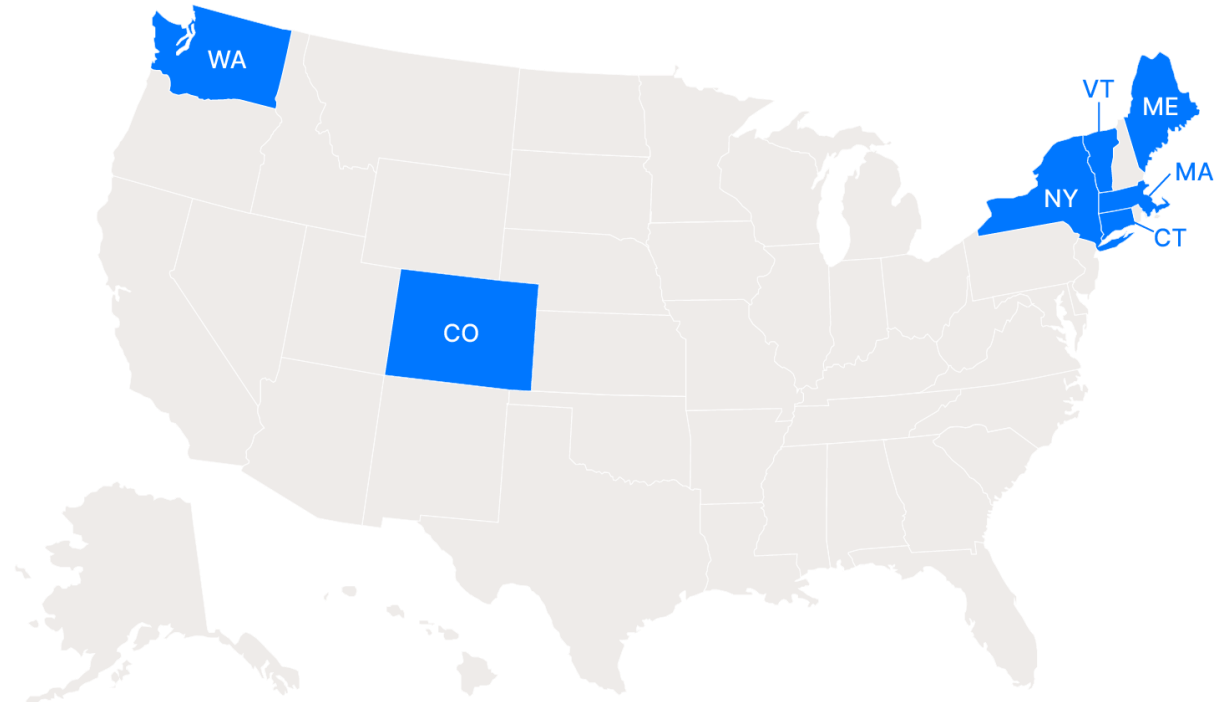
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## COLORADO:

### Making the Case to Implement Recycling Refunds alongside Extended Producer Responsibility to Achieve Maximum

**Material Recovery:** Colorado recently passed EPR, but it has yet to be implemented. This analysis compares the performance of implementing EPR alone vs. implementing EPR and RR together.

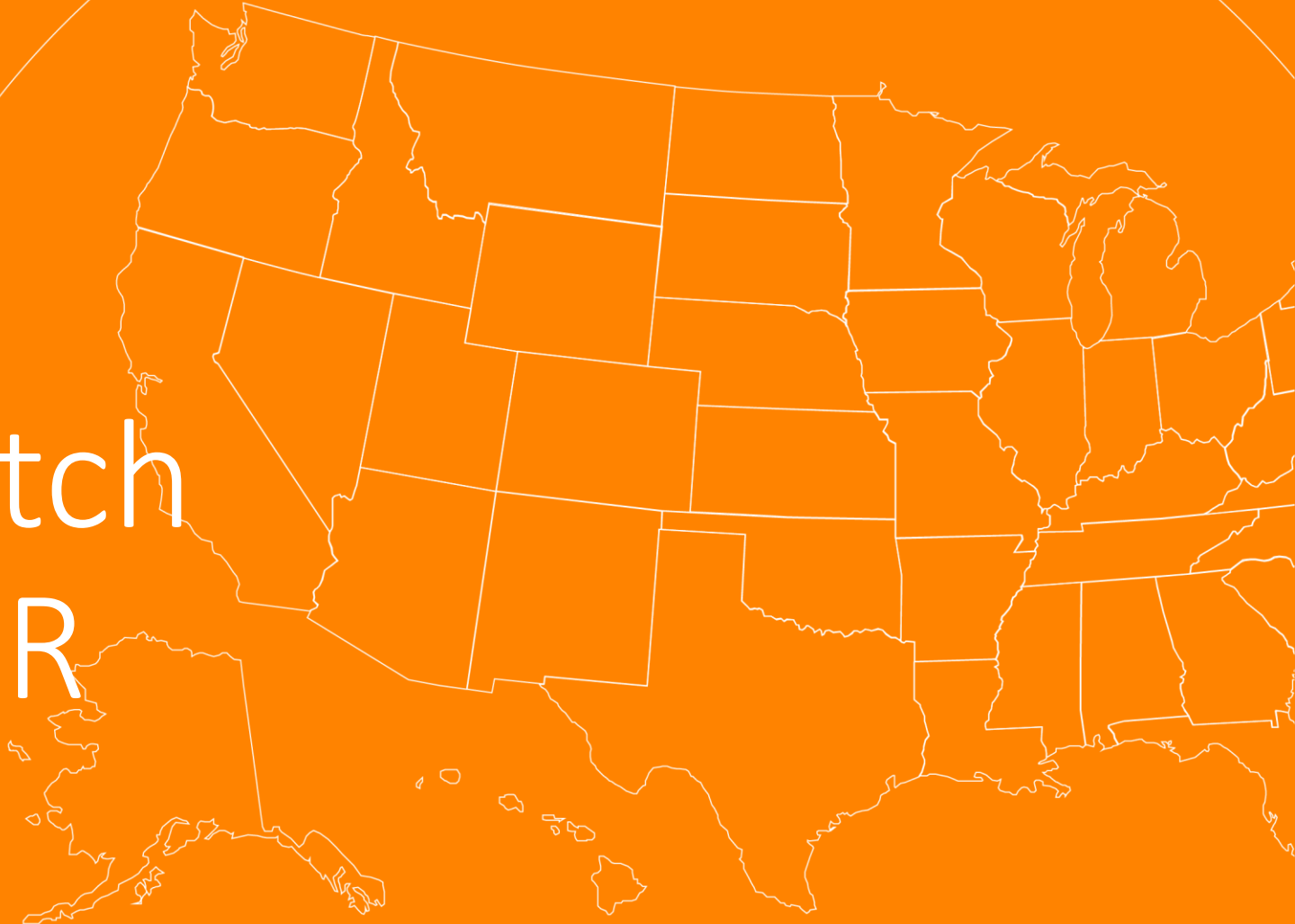
## Geographic Scope of State Deep Dives



# Northeast Case Study: Modernizing Policies To Match Best In Class RR



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# IMPACTS OF MODERNIZING RECYCLING REFUNDS IN THE NORTHEAST

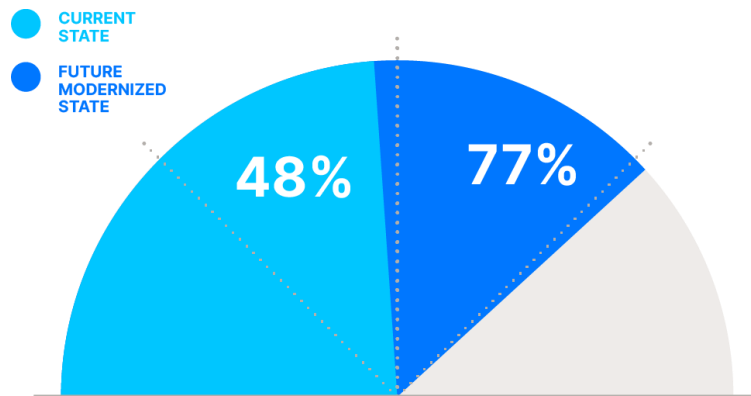
Over 27 billion containers would be recycled when an optimized RR is delivered alongside existing curbside containers.

- 9 billion more containers than currently recycled.

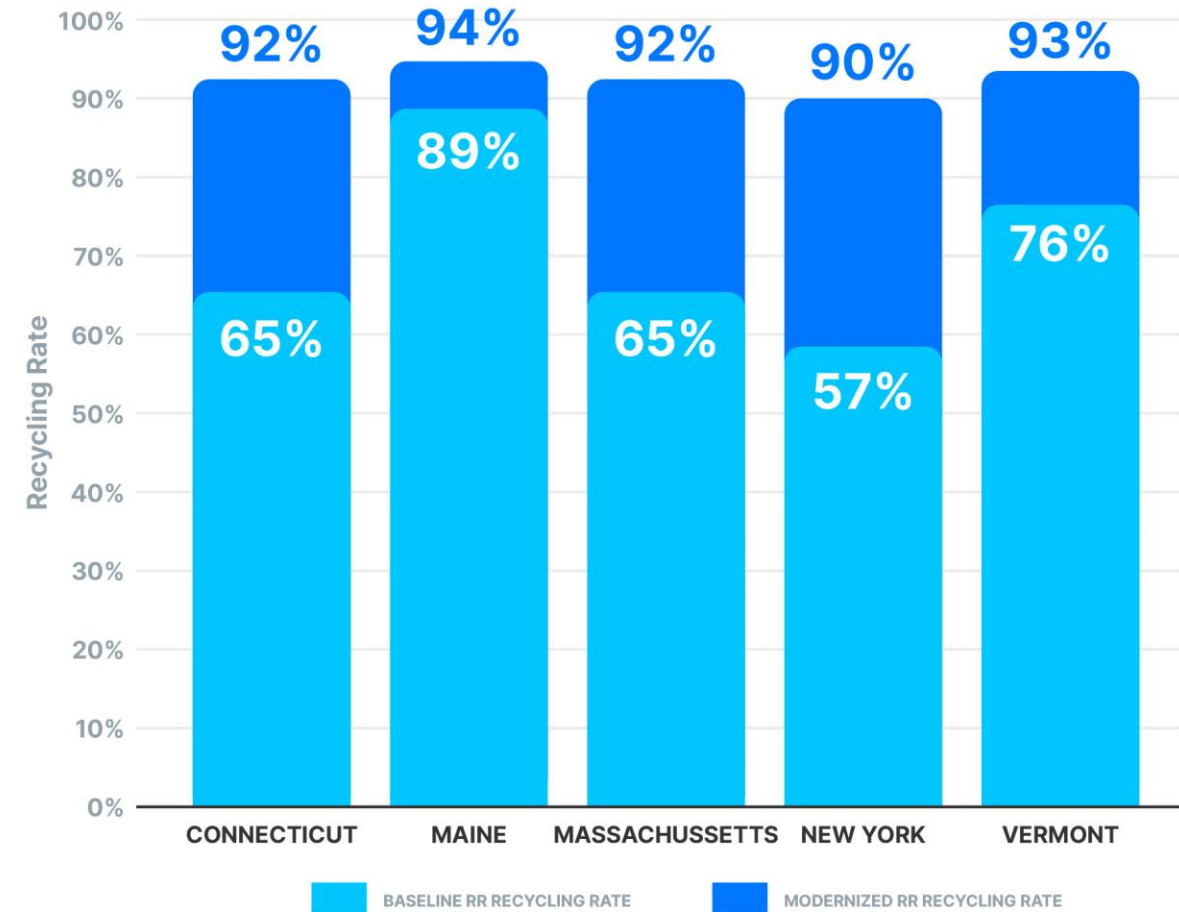
1.8 million tons of recycled content to support circular supply chains with a market value of \$375M.

- This is 460,000 tons more than currently recycled.

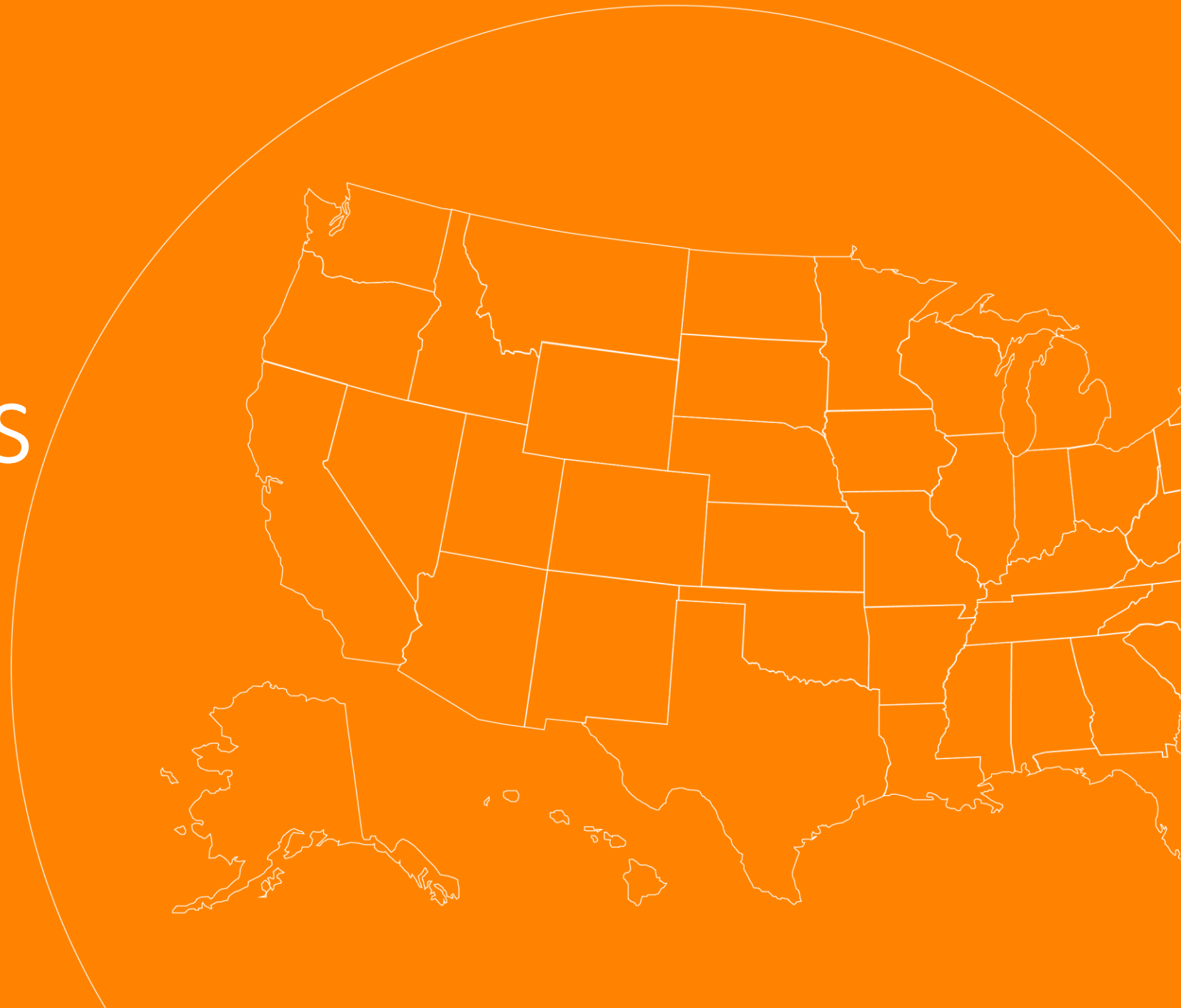
## Closed-Loop Recycling Impacts



IMPACT OF MODERNIZED RR ON RECYCLING RATES



# Impact Of EPR + RR Casestudies



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# IMPLEMENTING EXTENDED PRODUCER RESPONSIBILITY (EPR) + RECYCLING REFUNDS (RR) PROGRAMS TOGETHER PROVIDES A MULTITUDE OF BENEFITS



**Accelerates Maximum Recovery Rates to Maximize Environmental Benefits:** Achieves highest beverage recycling rate and high overall packaging recycling rates.



**Enables Close Loop Recycling to Create a Strong Domestic Supply of Material:** RR provides better material quality which leads to more closed loop recycling.



**Maximizes Access & Convenience:** Include businesses, schools, parks, on-the-go and will serve to complement recovery rates from curbside EPR programs.



**Protects and Enhances Local Recycling Programs:** Well-designed EPR can support and financially offset the loss of beverage packaging for MRFs, this means that every material will need to pay its own way, via eco-modulated producer fees. EPR will also increase the total tons processed by MRFs. Implementing EPR+RR together enhances and bolsters curbside recycling programs



**Co-Develop Programs to Drive Efficiency:** Develop infrastructure in tandem to maximize efficiencies and cost savings. For example, RR sites can serve as drop-offs for EPR or other hard to recycle materials.



**Litter Prevention:** RR programs have up to 84% less littered beverage containers than states without a RR. Reduce overall litter by up to 65%.



**Expands Reuse and Refill Opportunities:** Environmental NGOs are advocating for refill in EPR, but RR provides the mechanism to achieve this.



# PROTECT AND ENHANCE LOCAL RECYCLING PROGRAMS



Together EPR and RR can help protect and enhance local recycling programs.



**Shifts Financial Responsibility:** Well-designed EPR policies can provide a more stable source of funding for MRFs and financially offset the loss of beverage containers to a RR system. Under EPR, producers become financially responsible for end-of-life management of their products. Through EPR producers pay modulated fees to cover the cost of collection, sorting, and processing for the packaging they put onto the market. This means that every material will need to pay its own way.



**Provides Stable Funding:** EPR policies can provide a more stable source of funding for MRFs. Instead of relying on subsidizing their per-ton fees from municipalities and customers with revenue generated from selling recycled materials (which can fluctuate based on market demand and commodity prices, MRFs can receive consistent financial support from producers that cover the full costs of processing and capital improvements, making their operations more financially sustainable.



**Increases Recycling Tonnage Throughput:** EPR expands recycling access to all residents across the state and increases the total tons of recyclables collected and processed.



**Increase Materials Captured for Recycling and Improve Material Quality:** While RR diverts beverage containers away from MRFs, MRFs will be able to capture other types of recyclables (such as other types of aluminum) that they may fail to capture today. Also by reducing the number of glass bottles processed through a MRF may reduce contamination from broken glass and improve the quality of paper bales.

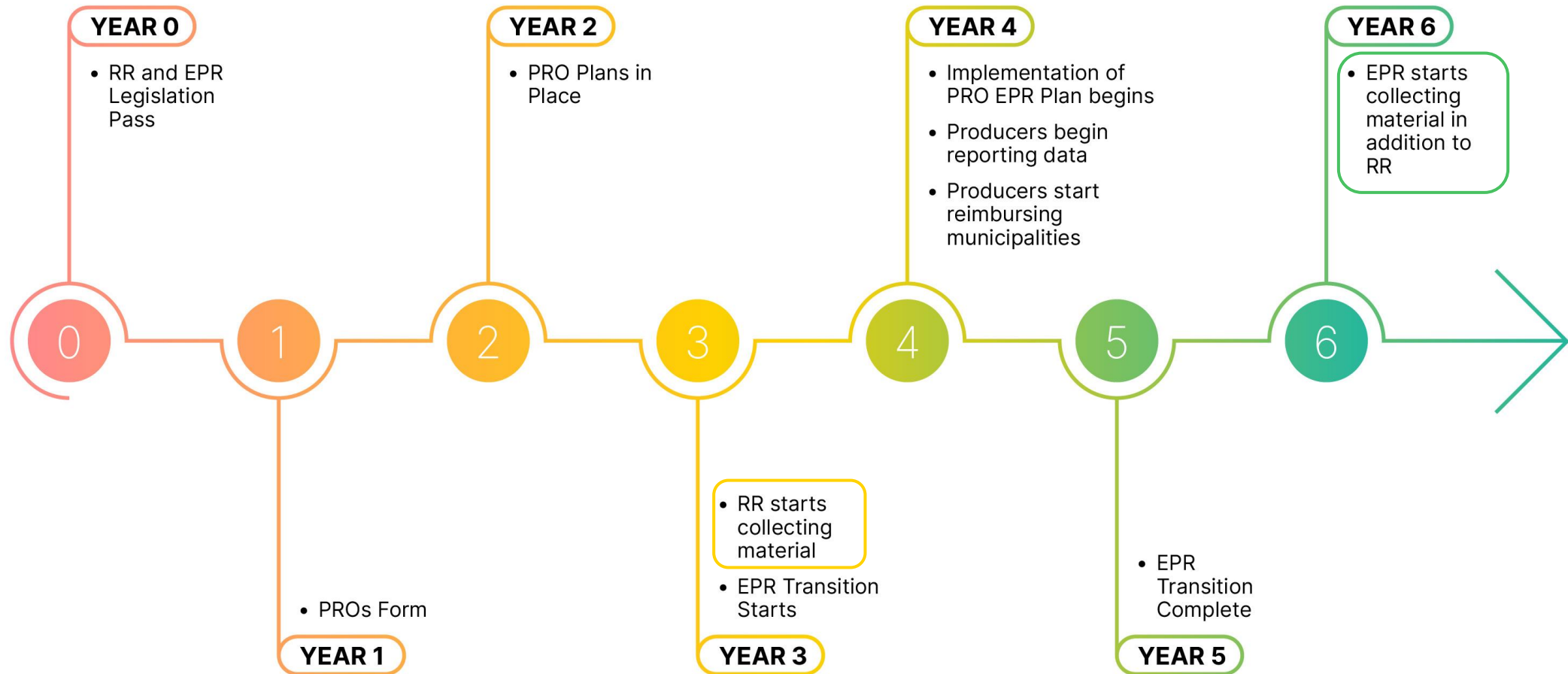


**Ability to Redeem the Refund:** MRFs and recycling programs should have an opportunity to turn beverage containers over to the responsibility organization to receive at least a portion of the unredeemed refund.



**Provide a Temporary Curbside Augmentation Fund:** The RR Responsibility Organization can also offer financial support to aid local recycling programs and MRFs during the transition to EPR via a temporary augmentation fund. The fund can help compensate MRFs and recycling programs for the loss of revenue from beverage container scrap value for a few years until EPR is fully operational, and aid with upgrades and capital investments needed to adjust systems to new material composition.

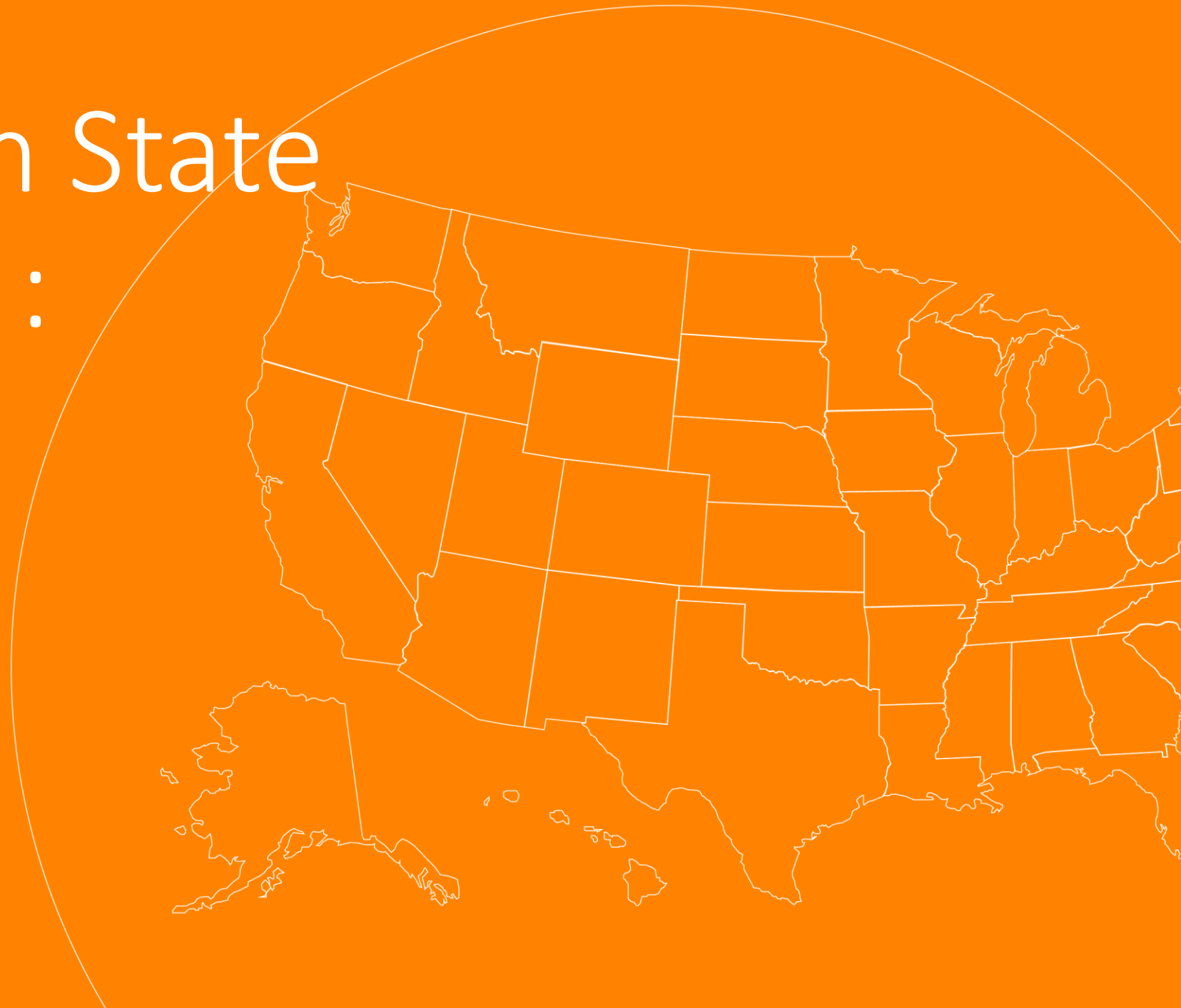
# TIMELINE OF POLICY IMPLEMENTATION



# Washington State Case Study : Impact of EPR+RR



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CASE STUDY

# WASHINGTON

26% RECYCLING RATE

WITHOUT FIBER AND FLEXIBLE PLASTICS (FFP)

## RANKING

RECYCLING RANK **2021** #15  
 RECYCLING RANK **2018** #15

POPULATION  
 7,740,745  
 ESTIMATED POPULATION WITH ACCESS TO RECYCLING: 89%

CENSUS SUB REGION  
 PACIFIC

RECYCLING REFUND STATE  
 NO

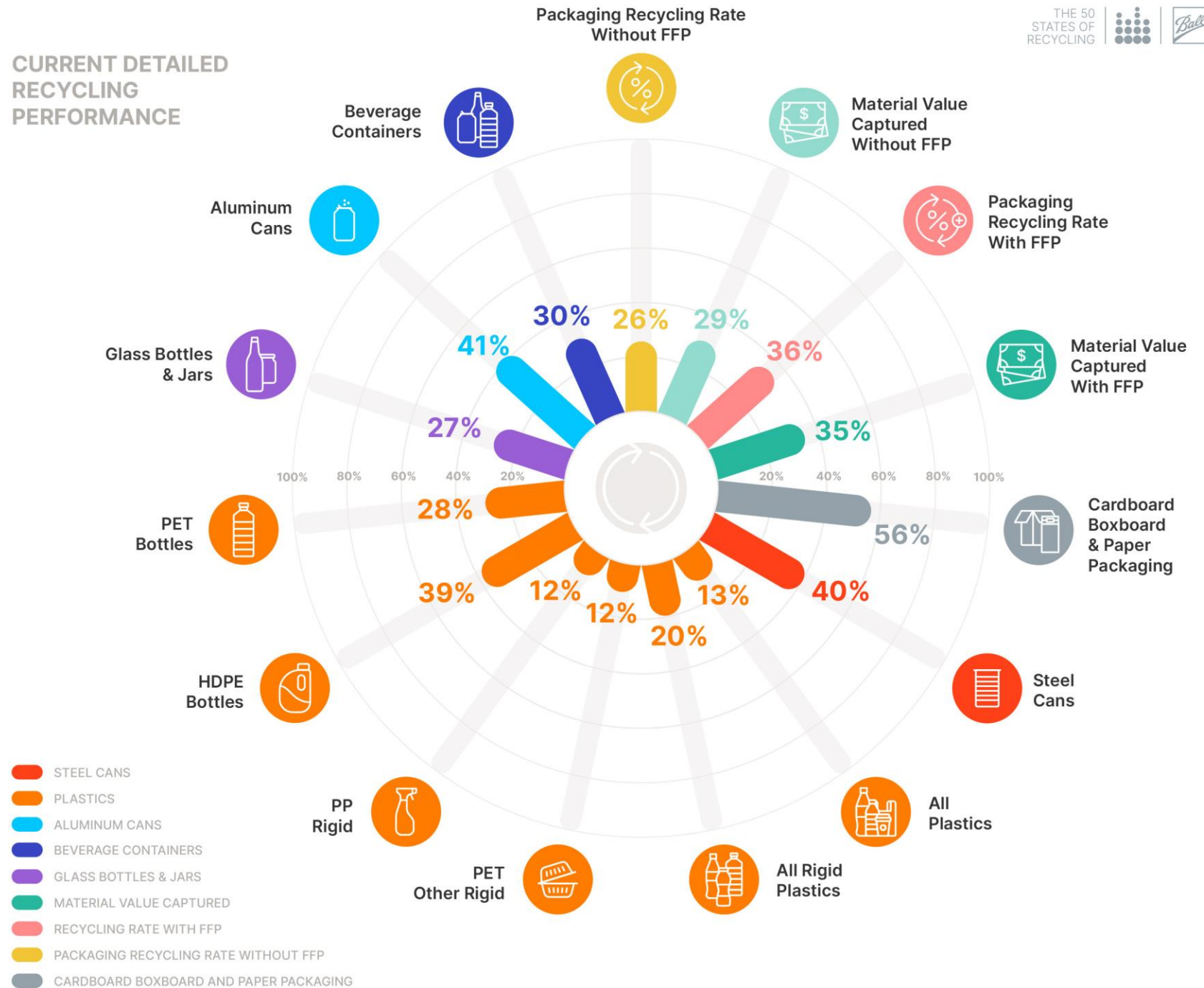
## DATA QUALITY



## ANALYSIS OVERVIEW

Since EPR policy typically only includes residential waste, the EPR analysis focuses only on residential packaging waste. While the RR analysis includes all beverage containers both from the residential and commercial sectors.

## CURRENT DETAILED RECYCLING PERFORMANCE



CASE STUDY

# WASHINGTON

59% RECYCLING RATE WITH EPR  
WITHOUT FIBER AND FLEXIBLE PLASTICS (FFP)

## HIGHLIGHTS

The implementation of EPR could substantially impact recycling rates in WA.

Currently, the recycling rate for 'Packaging without FFP' is 26%, but with EPR, it could potentially increase to 59%.

The recycling rate for 'Packaging with FFP' is currently 36%, but has the potential to jump to 60%.

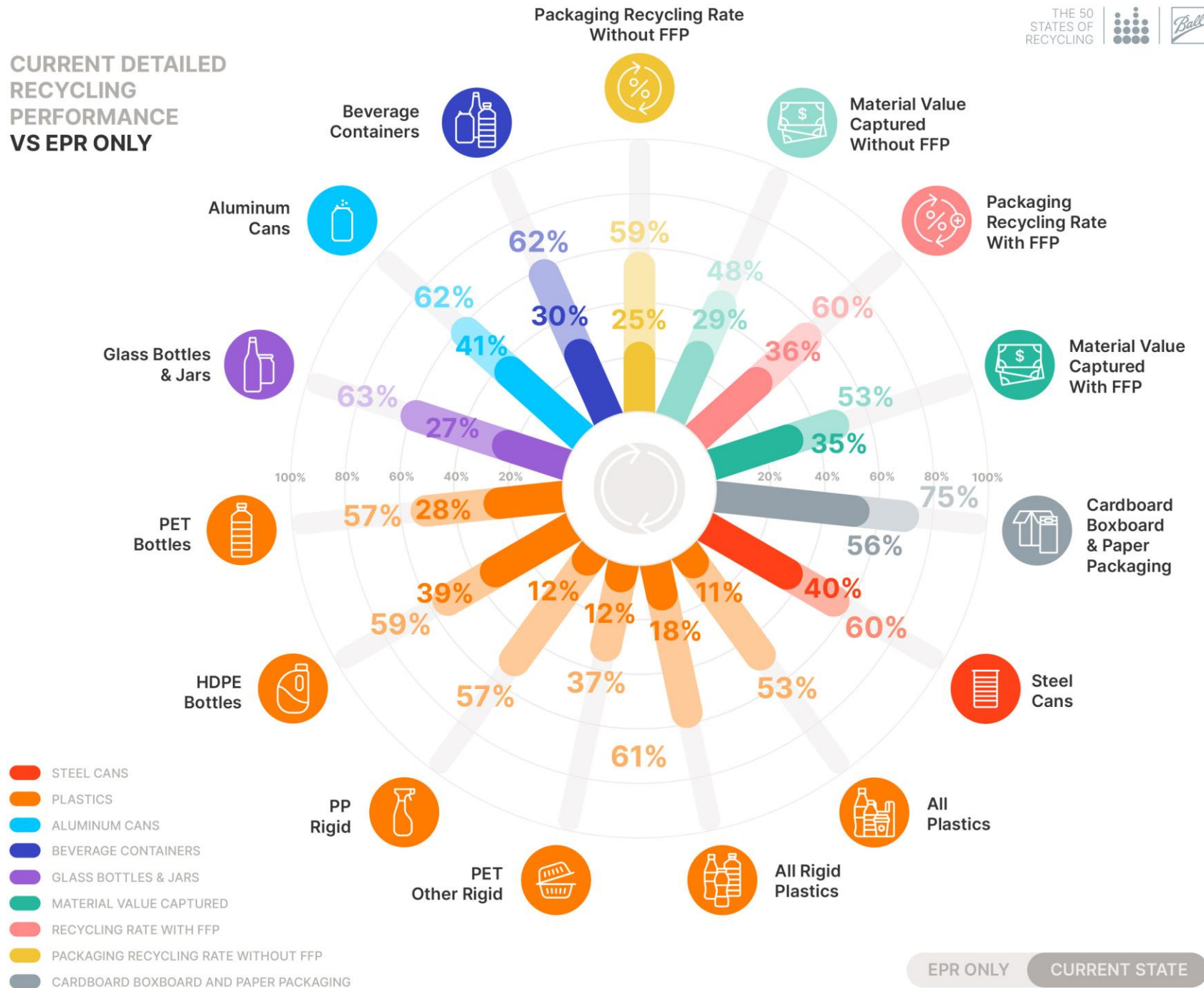
A noticeable change is expected for 'All plastic', with the recycling rate increasing from 11% to 53%, and

'Beverage containers' in particular could see a significant improvement, as only 30% currently find their way to recycling, but under the proposed legislation this rate could double to 62%.

## ANALYSIS OVERVIEW

Since EPR policy typically only includes residential waste, the EPR analysis focuses only on residential packaging waste. While the RR analysis includes all beverage containers both from the residential and commercial sectors.

### CURRENT DETAILED RECYCLING PERFORMANCE VS EPR ONLY





CASE STUDY

# WASHINGTON

78% RECYCLING RATE WITH EPR + RR  
WITHOUT FIBER AND FLEXIBLE PLASTICS (FFP)

## HIGHLIGHTS

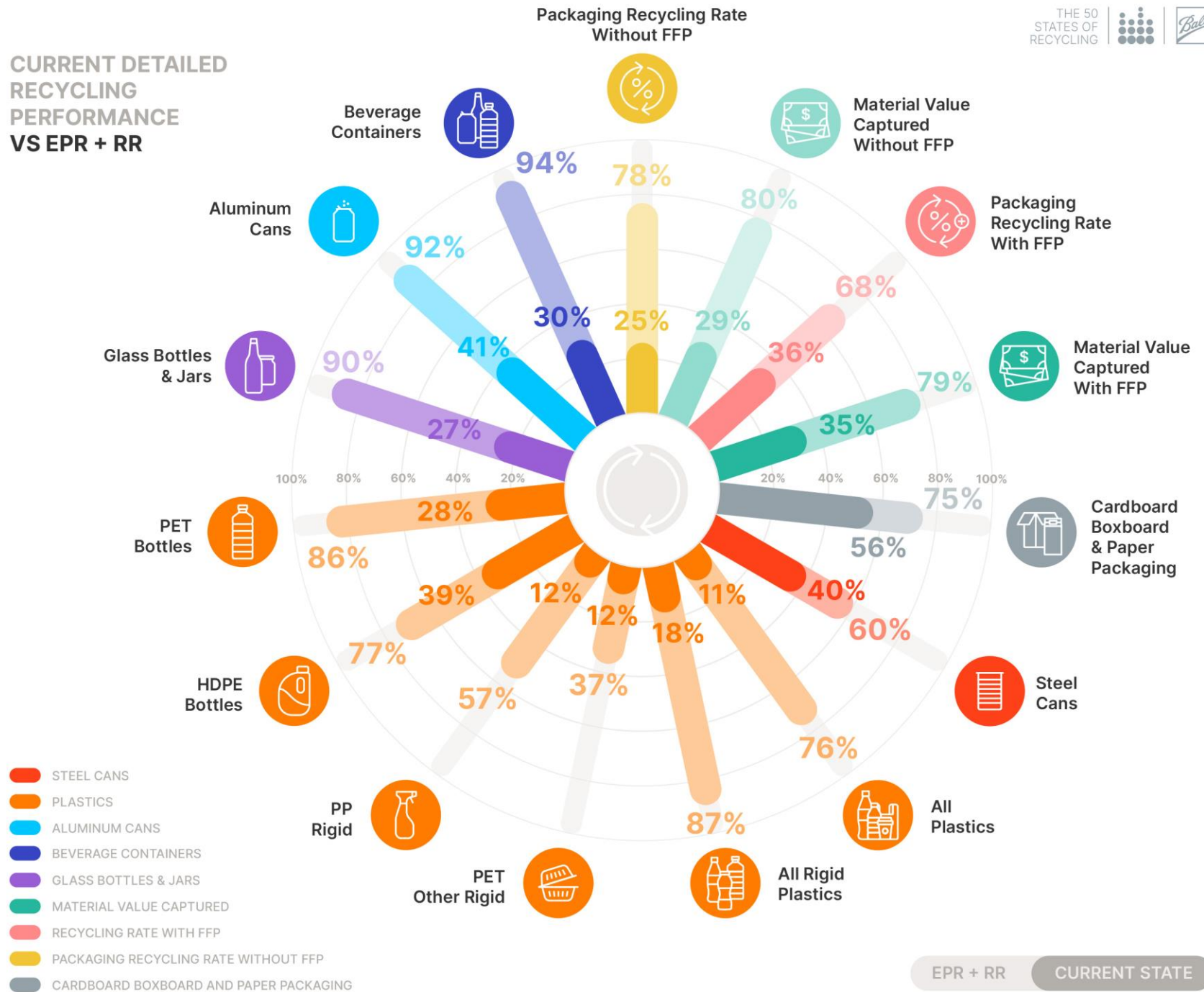
If WA were to implement EPR+RR legislation, there's a potential for significant improvements in recycling rates compared to the 'EPR only' scenario.

- The overall recycling rates for 'Packaging without FFP', currently at 26%, might experience a notable increase, potentially reaching 78% with EPR+RR.
- This positive change is not limited to a specific category but spans various packaging segments. In the case of 'Packaging with FFP', recycling rates, currently at 36%, could rise to 68%, showcasing advancements in waste management practices under the EPR+RR scenario.
- The impact extends to 'All plastics', with the recycling rate possibly increasing from 11% to 76%.
- Embracing the proposed legislations could result in a substantial boost for 'Beverage containers', increasing recycling rates from the current 30% to 94%.

## ANALYSIS OVERVIEW

Since EPR policy typically only includes residential waste, the EPR analysis focuses only on residential packaging waste. While the RR analysis includes all beverage containers both from the residential and commercial sectors.

### CURRENT DETAILED RECYCLING PERFORMANCE VS EPR + RR



- STEEL CANS
- PLASTICS
- ALUMINUM CANS
- BEVERAGE CONTAINERS
- GLASS BOTTLES & JARS
- MATERIAL VALUE CAPTURED
- RECYCLING RATE WITH FFP
- PACKAGING RECYCLING RATE WITHOUT FFP
- CARDBOARD BOXBOARD AND PAPER PACKAGING

# EPR + RR DELIVERS BETTER PERFORMANCE AT FASTER PACE – DELIVERING MAXIMUM RECYCLING RATES FOR WASHINGTON

Well-designed RR programs can achieve 90% recovery within just a few years while EPR programs take 5-10 years to achieve peak recycling rates between 50%-65%. By pairing the programs together, states can deliver higher recycling rates more quickly.

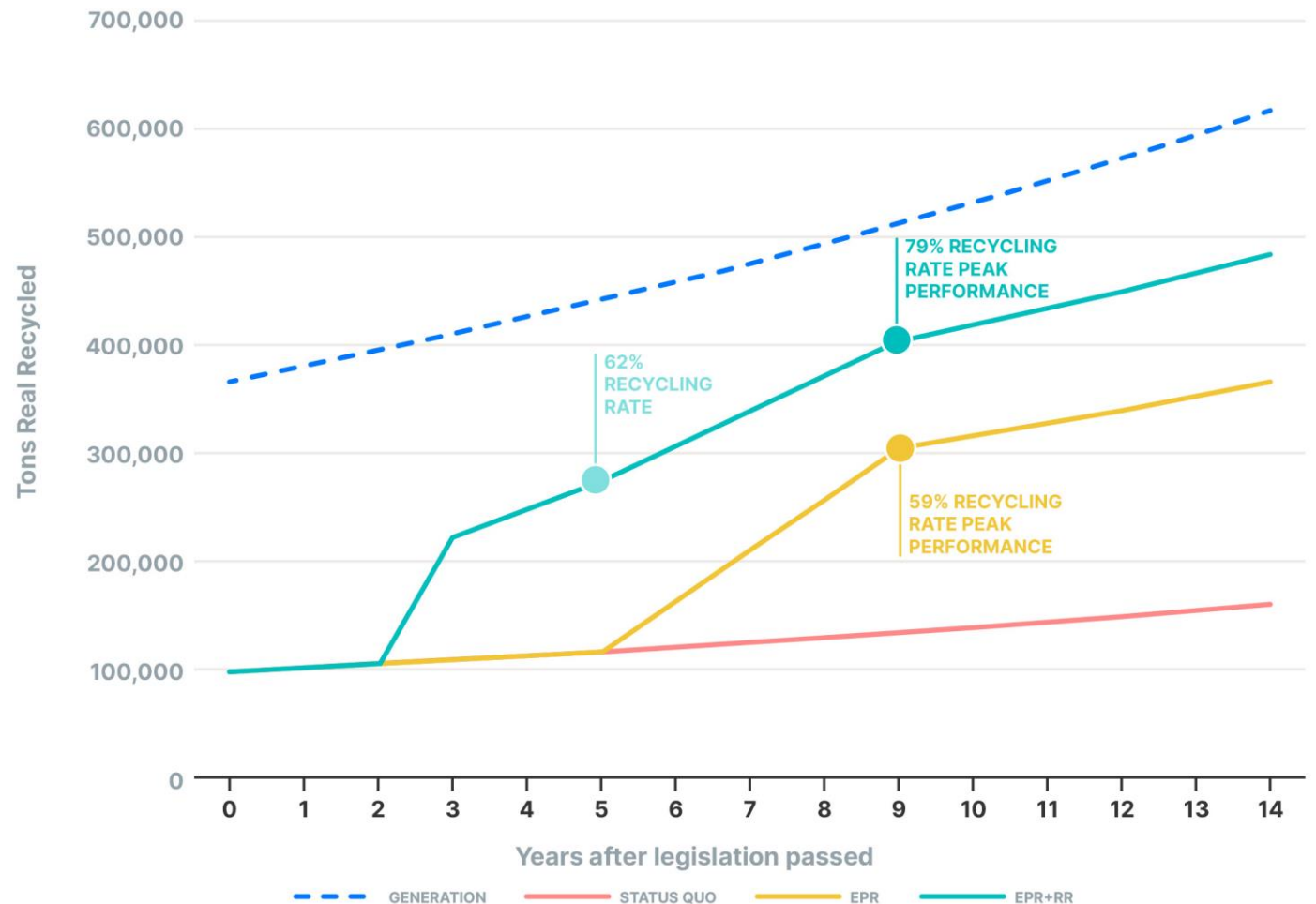
Baseline: 26% recycling rate

EPR alone is estimated to achieve a peak recycling rate of 59% within 9 years

However, EPR+RR leads to accelerated progress:

- 62% recycling rate by year 5
- 79% recycling rate by year 9

## Impact of Policy on Recycling Rates in Washington Excluding FFP



# EPR + RR DELIVERS BETTER PERFORMANCE AT FASTER PACE – DELIVERING MAXIMUM RECYCLING RATES FOR WASHINGTON BEVERAGE CONTAINERS

While EPR can be an important first step to increasing recycling rates for beverage packaging, relying on EPR alone likely will not result the high recycling rates needed to meet Washington’s PCR targets.

Baseline: 30% recycling rate

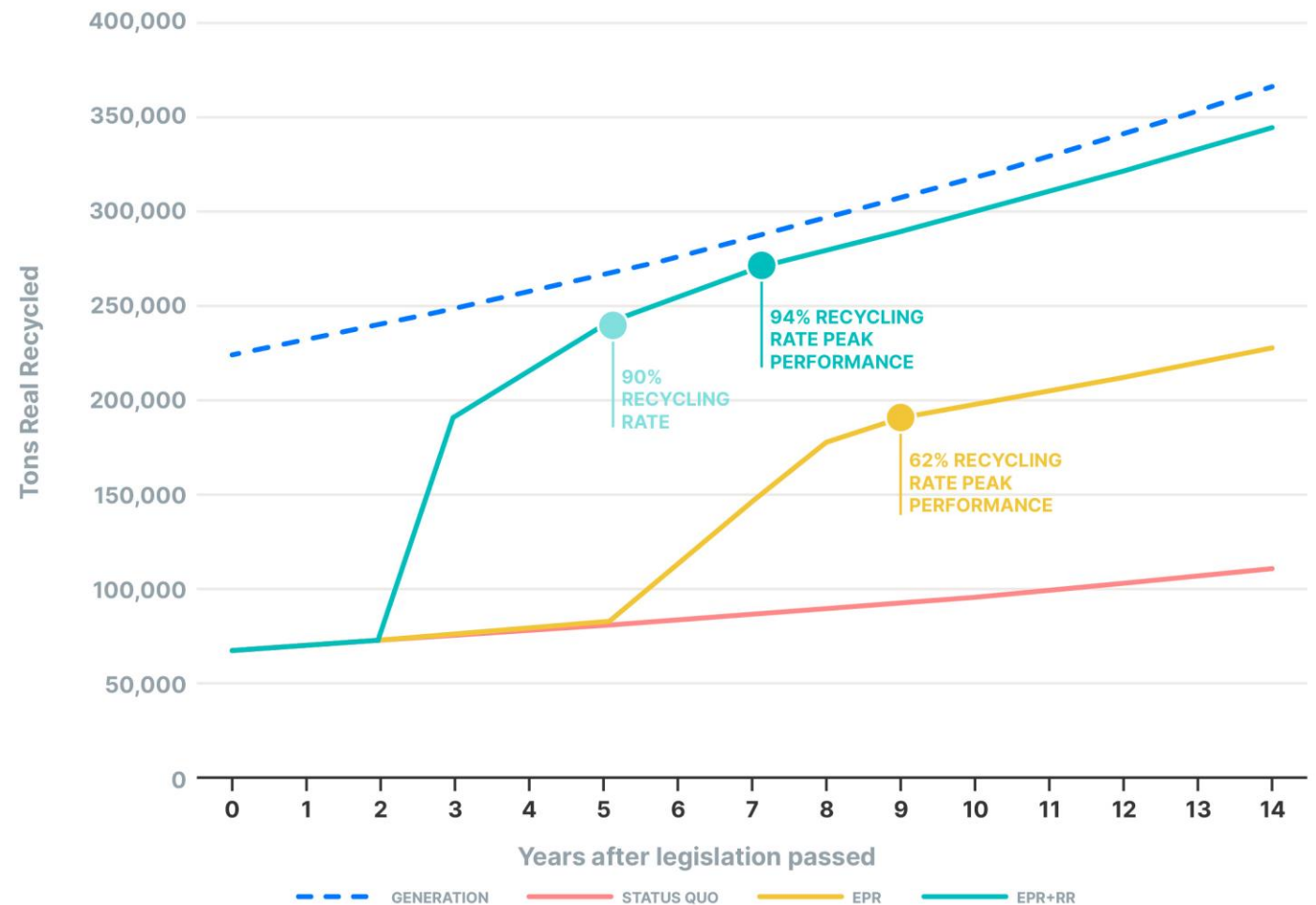
EPR alone is estimated to achieve a peak recycling rate of 62% within 9 years

However, EPR+RR leads to accelerated progress:

- 90% recycling rate by year 5
- 94% recycling rate by year 9

Due to the implementation timeline differences – RR would recycle approximately 411,000 more tons of packaging material before the full effects of EPR investment are realized.

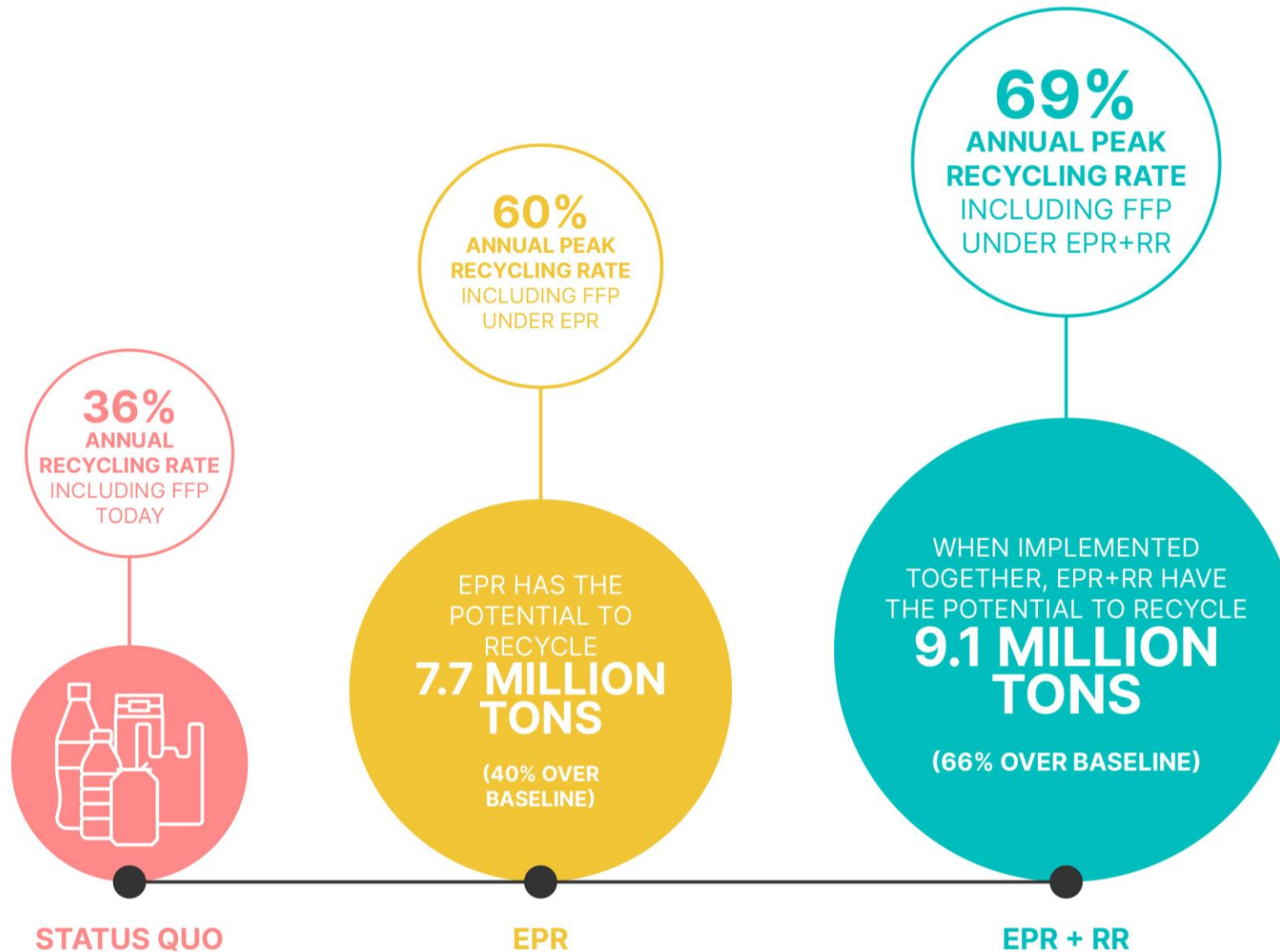
## Impact of Policy on Beverage Container Recycling in Washington



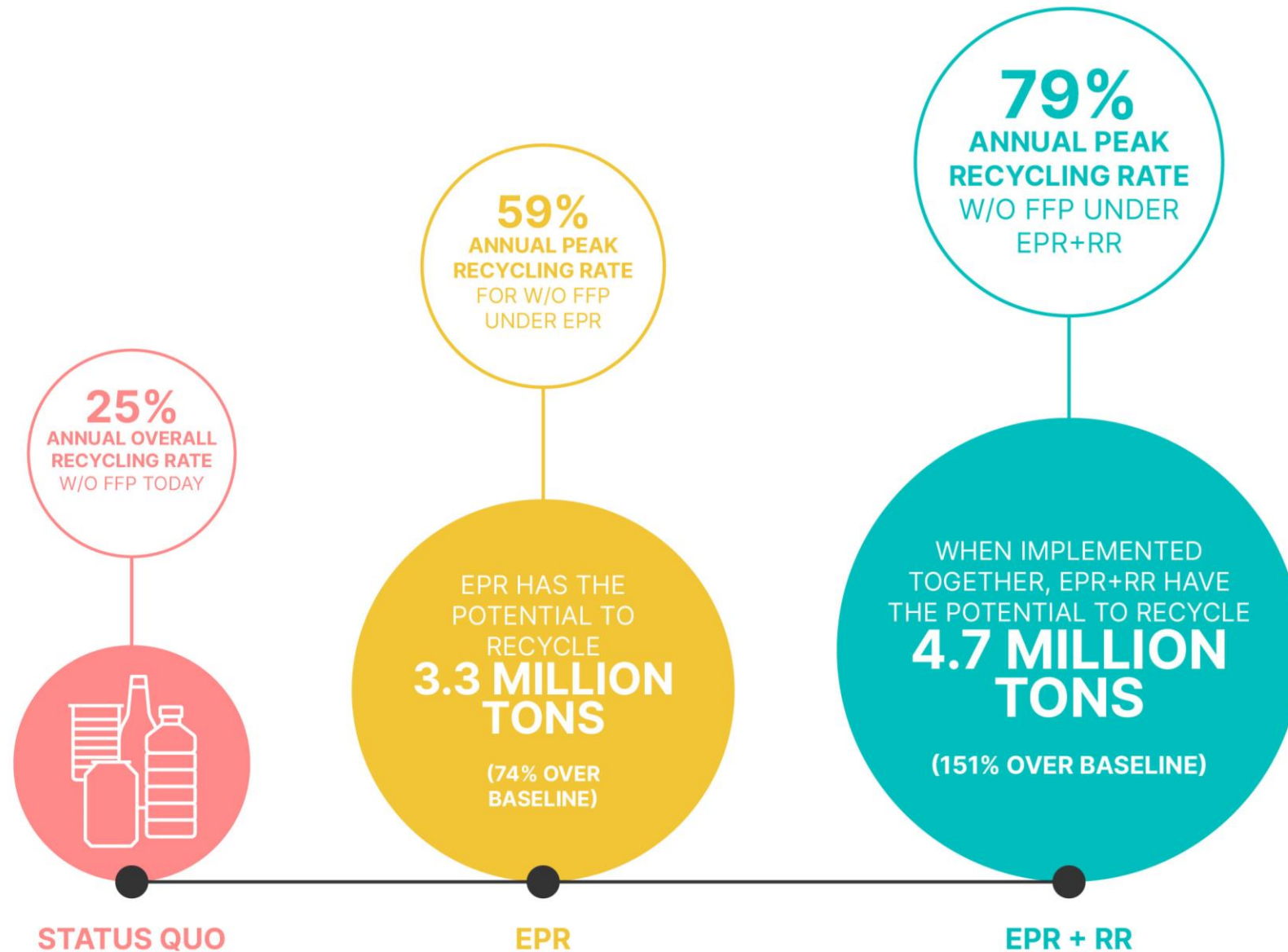
THE 50 STATES OF RECYCLING



# IMPACT OF POLICY ON CUMULATIVE TONS RECYCLED OVER 15 YEARS (INCLUDING FFP)



# IMPACT OF POLICY ON CUMULATIVE PACKAGING TONS RECYCLED OVER 15 YEARS (EXCLUDING FFP)



**25%**  
ANNUAL OVERALL  
RECYCLING RATE  
W/O FFP TODAY



**STATUS QUO**

**59%**  
ANNUAL PEAK  
RECYCLING RATE  
FOR W/O FFP  
UNDER EPR

EPR HAS THE  
POTENTIAL TO  
RECYCLE  
**3.3 MILLION  
TONS**

(74% OVER  
BASELINE)

**EPR**

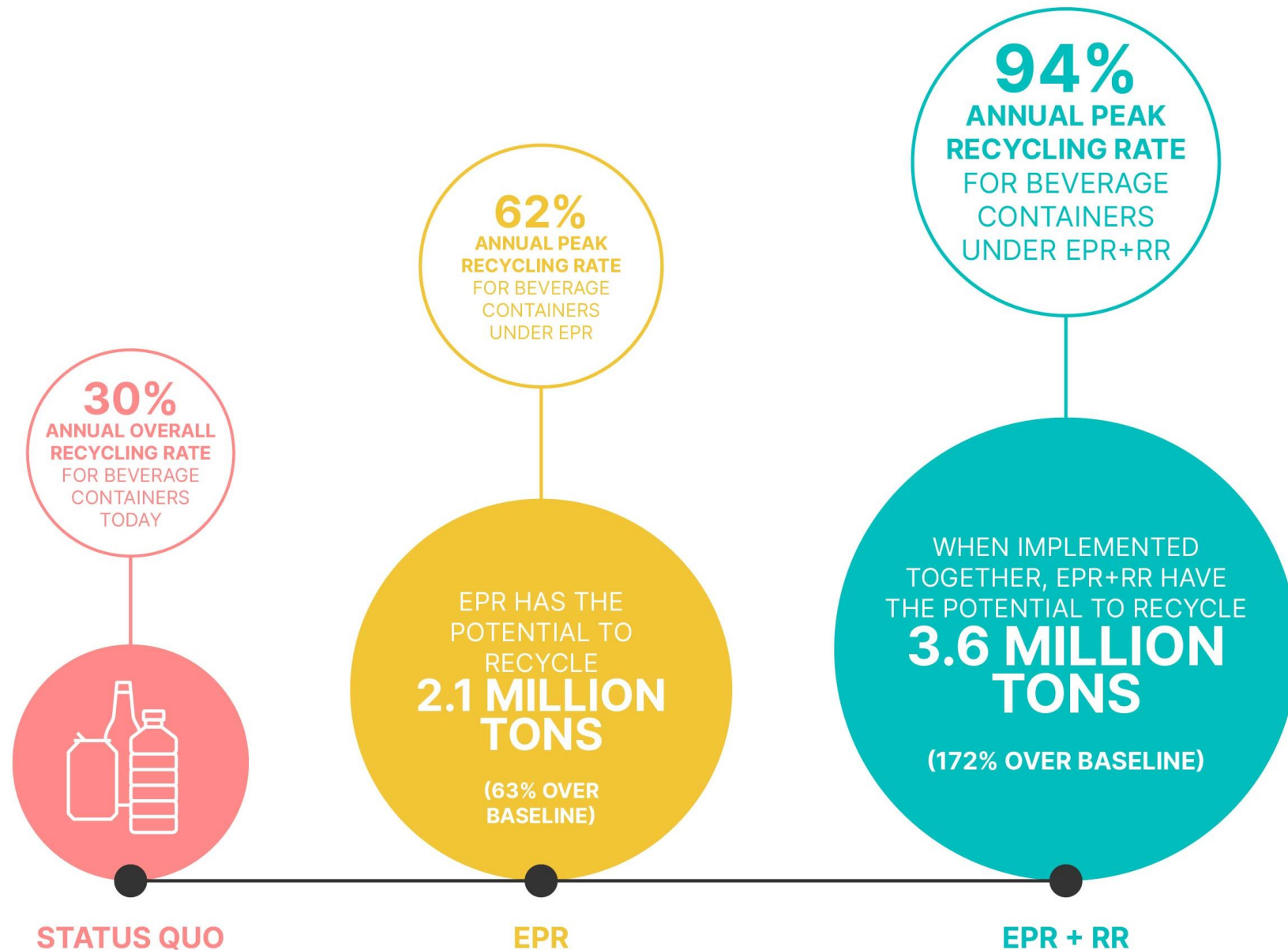
**79%**  
ANNUAL PEAK  
RECYCLING RATE  
W/O FFP UNDER  
EPR+RR

WHEN IMPLEMENTED  
TOGETHER, EPR+RR HAVE  
THE POTENTIAL TO RECYCLE  
**4.7 MILLION  
TONS**

(151% OVER BASELINE)

**EPR + RR**

# IMPACT OF POLICY ON CUMULATIVE BEVERAGE CONTAINER TONS RECYCLED OVER 15 YEARS



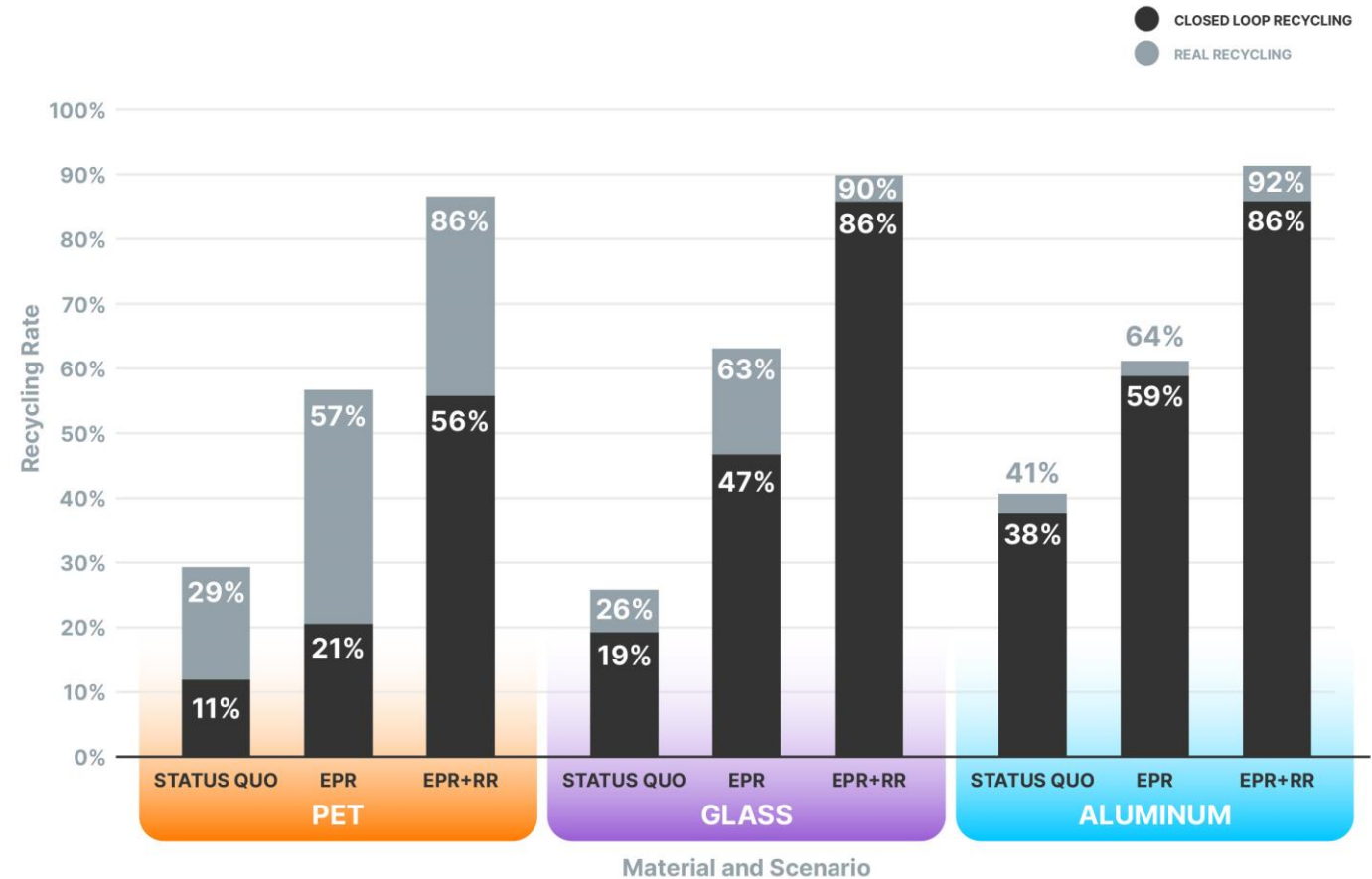
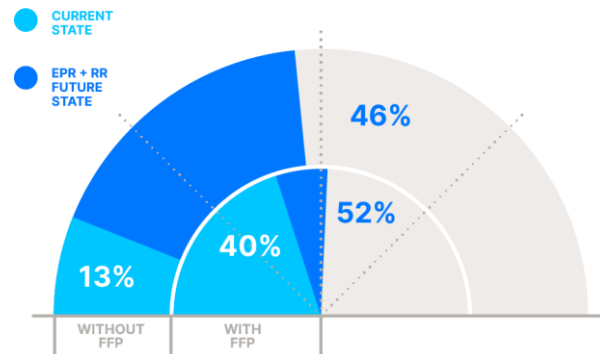
# WASHINGTON CLOSED LOOP RECYCLING

## CLOSED-LOOP RECYCLING IMPACTS

RR collection systems typically reduce the contamination of the material stream - allowing for higher-quality recycled content, which increases closed-loop recycling for beverage containers.

- At full implementation, EPR improves the amount of beverage container recycling in a closed-loop process by approximately 85,400 tons (111% over the status quo).
- EPR + RR increases this amount by 229,600 tons (3x the status quo) due to greater capture rates for beverage containers under RR and the addition of commercial beverage container tonnage.

Closed Loop Recycling Under Different Policy Scenarios



Amount of Packaging Sold into the Market that is Sorted for Recycling or Recycled in a Closed-Loop Process

# WASHINGTON

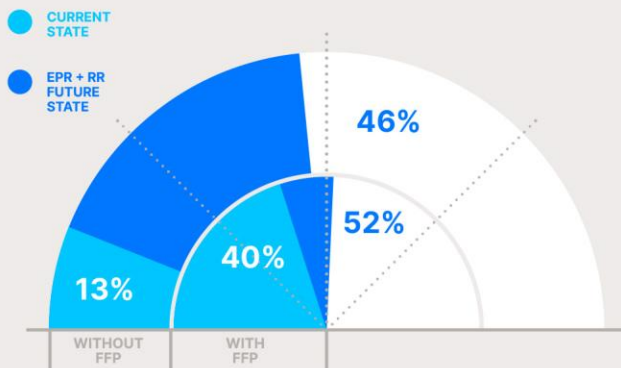
## CURRENT STATE OF RECYCLING

- In 2021, Washington recycled approximately 25% of packaging materials without FFP. This recycling performance increases to 46% when considering materials with FFP.
- The value of the material captured for recycling was \$69 million, just 47% of the total value of material that could be captured for recycling.
- Recycling in the state avoided GHG emissions of 2 million MTCO<sub>2</sub>e.

## OUTCOMES EPR+RR

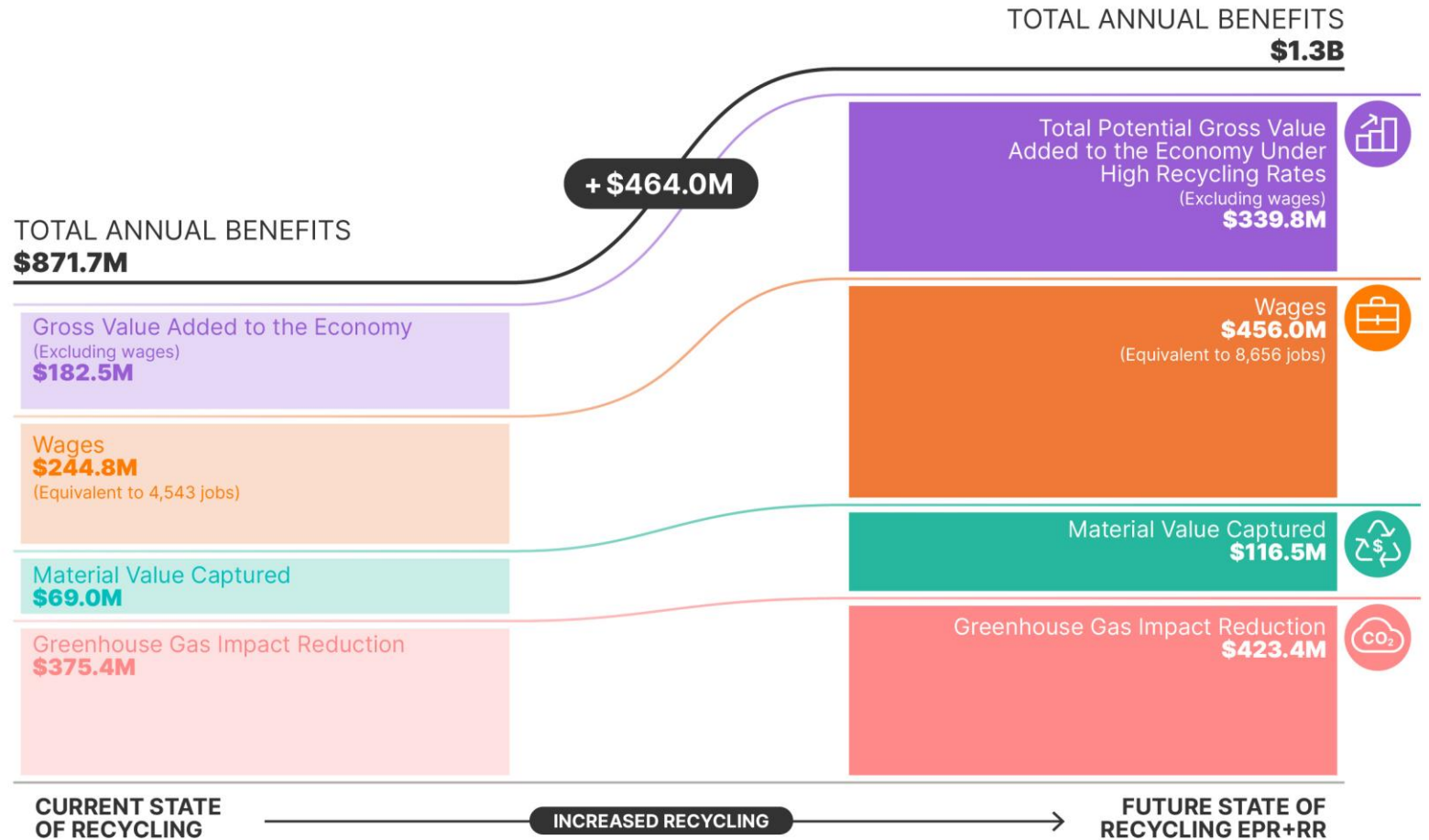
- Extended Producer Responsibility and Recycling Refund policy together could:
- Increase recycling related jobs from 4,500 to 8,700.
  - Place \$117 million of recycled material back in the market to support a circular economy and reduce the need for virgin material.
  - Avoid emissions of 2.2 million MTCO<sub>2</sub>e annually.

## CLOSED-LOOP IMPACTS



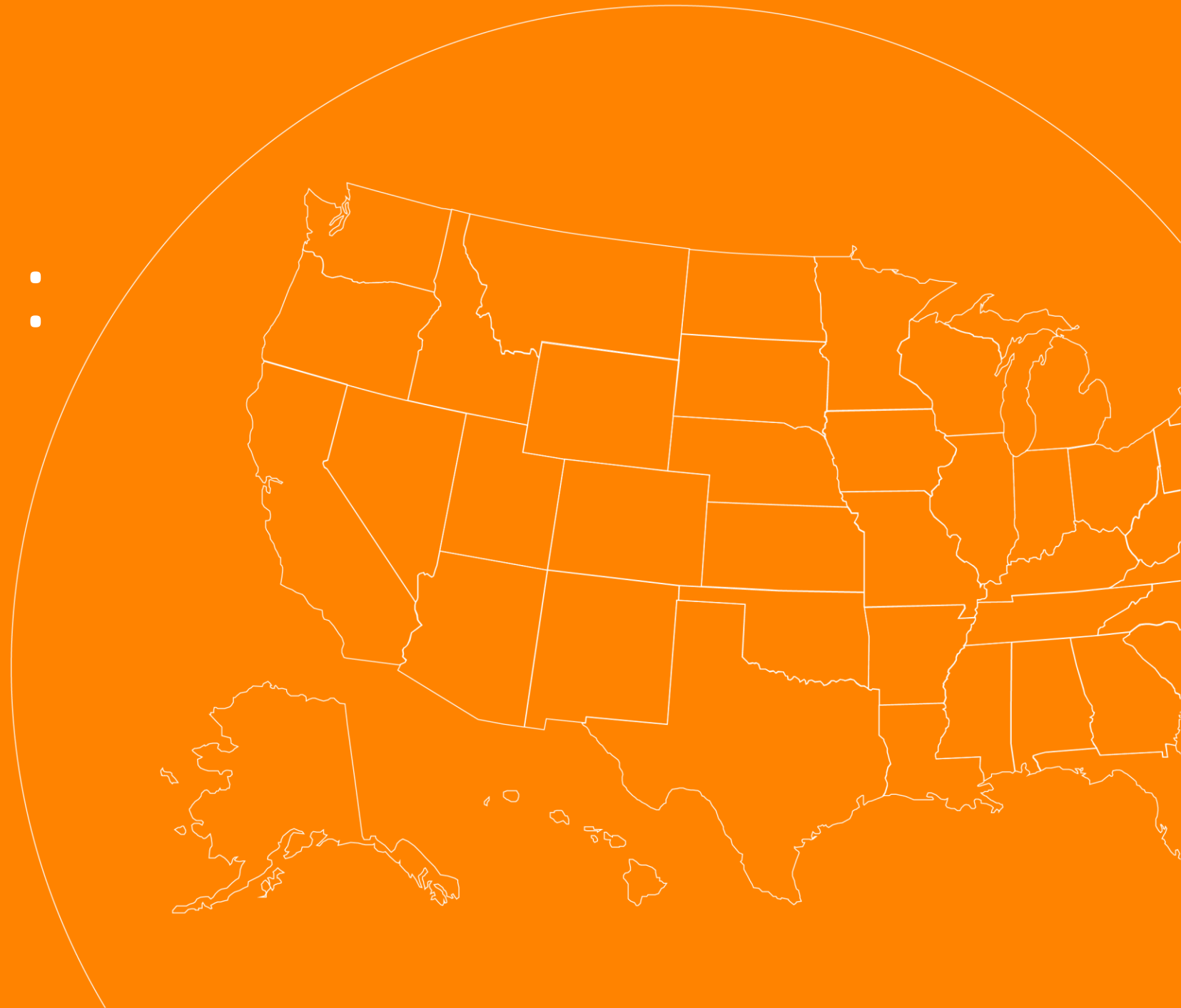
## THE ECONOMIC AND ENVIRONMENTAL OUTCOMES OF WELL-DESIGNED EXTENDED PRODUCER RESPONSIBILITY (EPR) + RECYCLING REFUND (RR) PROGRAMS

EPR assumes an overall recycling rate of 65% for residential packaging and RR assumes a 90% recycling rate for beverage containers





# Colorado Case Study : Impact of EPR+RR



THE 50  
STATES OF  
RECYCLING

CASE STUDY

# COLORADO

11% RECYCLING RATE

WITHOUT FIBER AND FLEXIBLE PLASTICS (FFP)

## RANKING

RECYCLING RANK **2021** **#41**  
 RECYCLING RANK **2018** **#35** -6

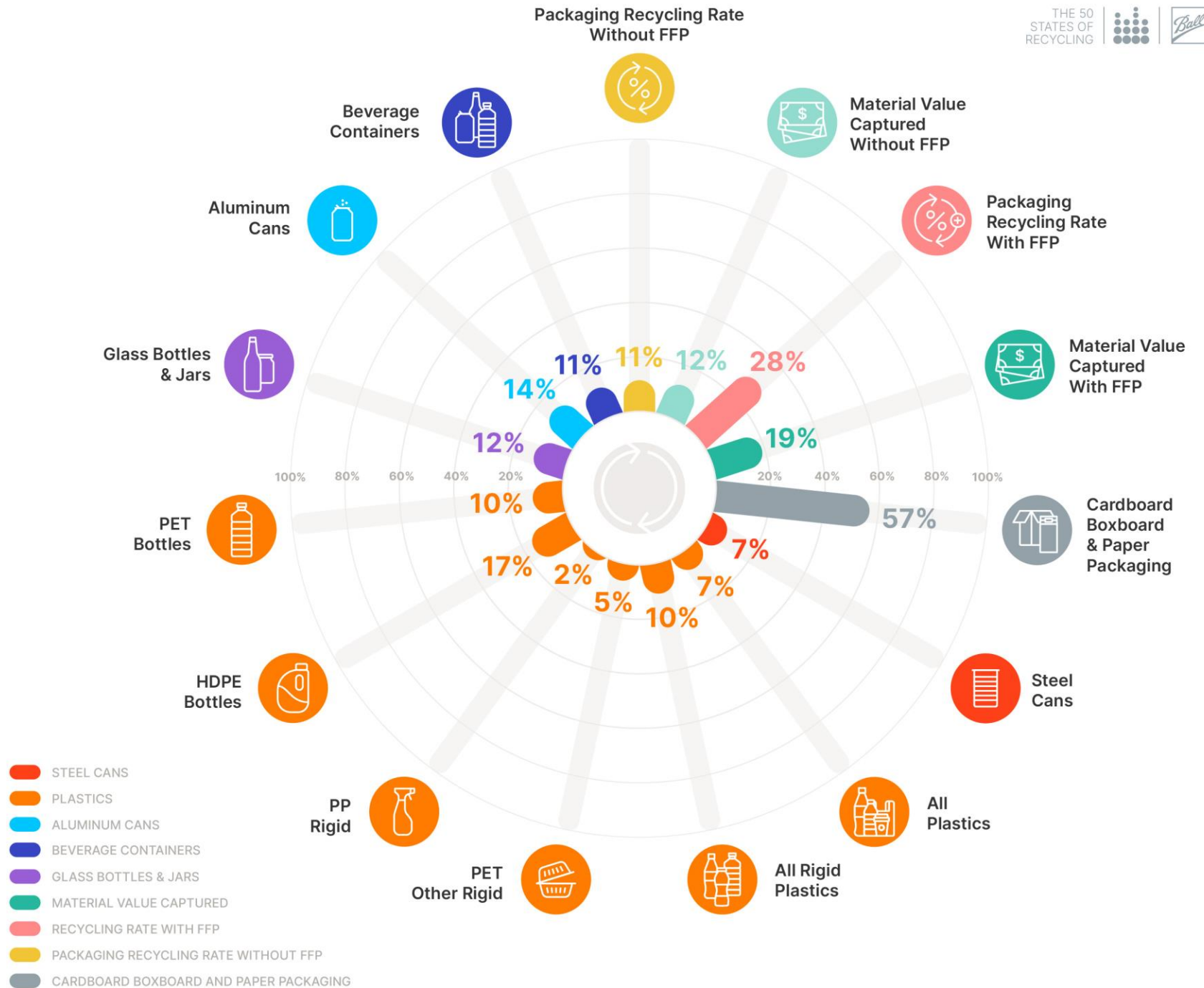
- POPULATION  
5,811,297
- CENSUS SUB REGION  
MOUNTAIN
- RECYCLING REFUND STATE  
NO

## DATA QUALITY



## ANALYSIS OVERVIEW

Since EPR policy typically only includes residential waste, the EPR analysis focuses only on residential packaging waste. While the RR analysis includes all beverage containers both from the residential and commercial sectors.



CASE STUDY

# COLORADO

49% RECYCLING RATE WITH EPR  
WITHOUT FIBER AND FLEXIBLE PLASTICS (FFP)

## HIGHLIGHTS

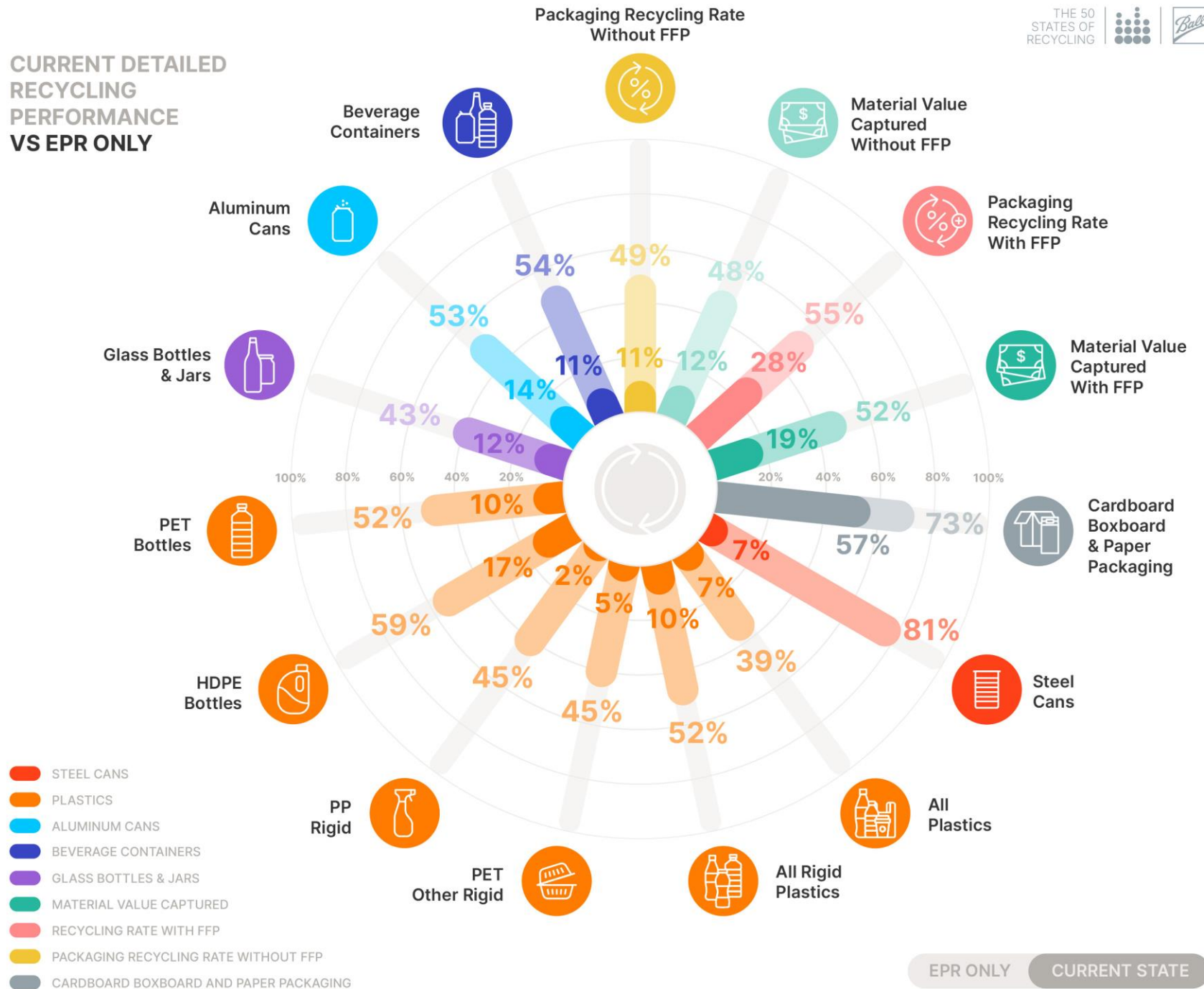
The introduction of EPR holds the potential to significantly transform recycling rates in Colorado.

- Presently, the recycling rate for 'Packaging without FFP' stands at 11%, but with EPR, there's a possibility of an increase to 49%.
- Similarly, for 'Packaging with FFP', currently at 28%, there's potential for a jump to 55%.
- A substantial shift is anticipated for 'All plastic', where the recycling rate is expected to climb from 7% to 39%, showcasing the positive impact of EPR on recycling practices.
- Specifically, 'Beverage containers' could witness notable improvement, as the current recycling rate is only 11%, but under the proposed legislation, there's potential to double the rate and reach 54%.

## ANALYSIS OVERVIEW

Since EPR policy typically only includes residential waste, the EPR analysis focuses only on residential packaging waste. While the RR analysis includes all beverage containers both from the residential and commercial sectors.

### CURRENT DETAILED RECYCLING PERFORMANCE VS EPR ONLY





CASE STUDY

# COLORADO

82% RECYCLING RATE WITH EPR + RR

WITHOUT FIBER AND FLEXIBLE PLASTICS (FFP)

## HIGHLIGHTS

If Colorado implements EPR+RR legislation, recycling rates could see significant improvement compared to 'EPR only.'

Recycling rates for 'Packaging without FFP,' currently at 11%, might rise to 82% with EPR+RR.

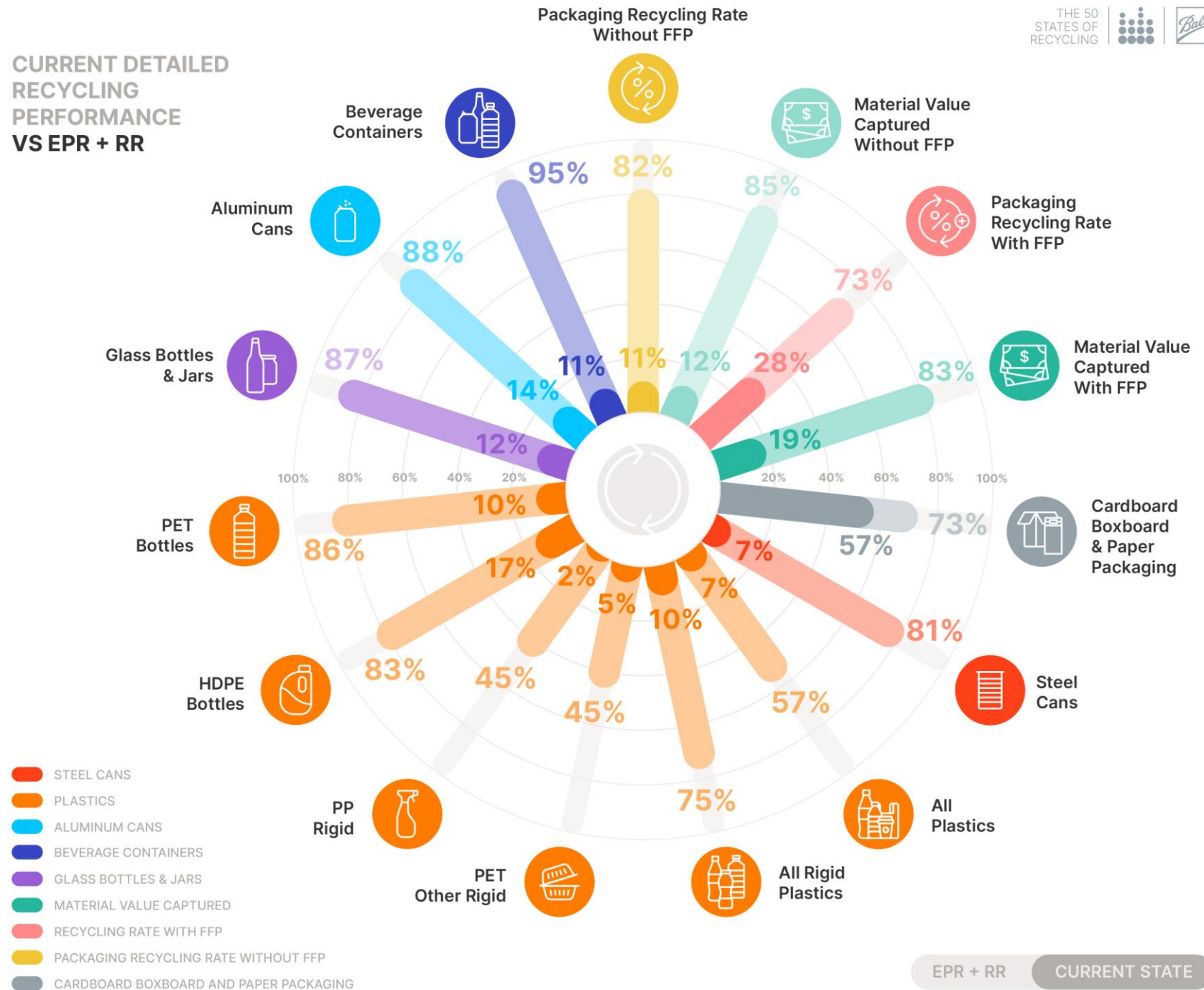
This positive trend spans various packaging segments, including 'Packaging with FFP,' which could go from 28% to 73%.

The impact extends to 'All plastics,' potentially increasing from 7% to 57%, while 'Beverage containers' could experience a remarkable boost, rising from 11% to 95%. The proposed legislation shows promise for a substantial shift in Colorado's recycling landscape.

## ANALYSIS OVERVIEW

Since EPR policy typically only includes residential waste, the EPR analysis focuses only on residential packaging waste. While the RR analysis includes all beverage containers both from the residential and commercial sectors.

### CURRENT DETAILED RECYCLING PERFORMANCE VS EPR + RR



- STEEL CANS
- PLASTICS
- ALUMINUM CANS
- BEVERAGE CONTAINERS
- GLASS BOTTLES & JARS
- MATERIAL VALUE CAPTURED
- RECYCLING RATE WITH FFP
- PACKAGING RECYCLING RATE WITHOUT FFP
- CARDBOARD BOXBOARD AND PAPER PACKAGING

# EPR + RR DELIVERS BETTER PERFORMANCE AT FASTER PACE – DELIVERING MAXIMUM RECYCLING RATES FOR COLORADO

Well-designed RR programs can achieve 90% recovery within just a few years while EPR programs take 5-10 years to achieve peak recycling rates between 50%-65%. By pairing the programs together, states can deliver high recycling rates more quickly.

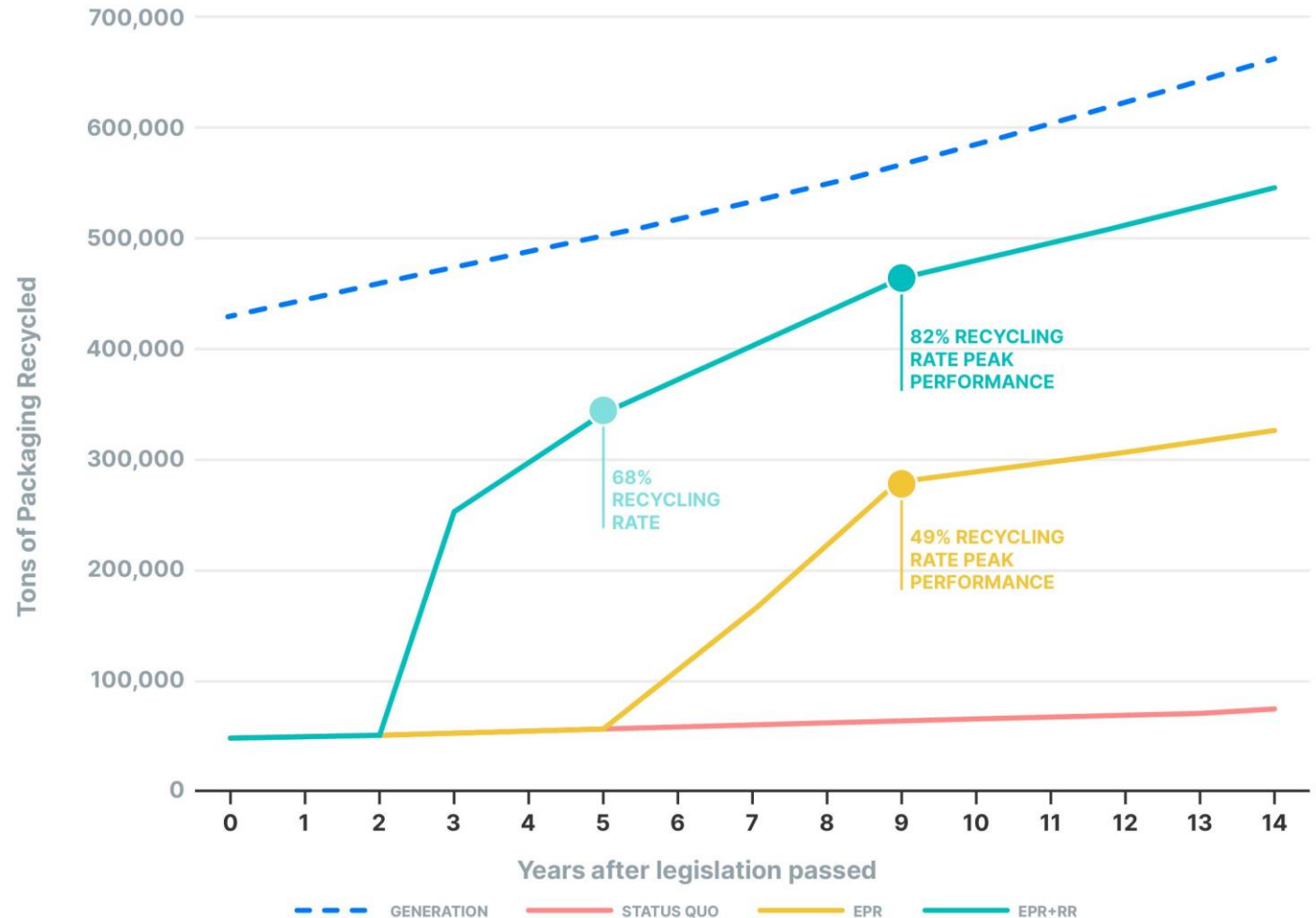
Baseline: 26% recycling rate

EPR alone is estimated to achieve a peak recycling rate of 49% within 9 years

However, EPR+RR leads to accelerated progress:

- 66% recycling rate by year 5
- 82% recycling rate by year 9

## Impact of Policy on Recycling Rates in Colorado Excluding FFP



# EPR + RR DELIVERS BETTER PERFORMANCE AT FASTER PACE – DELIVERING MAXIMUM RECYCLING RATES FOR COLORADO BEVERAGE CONTAINERS

Baseline: 30% recycling rate

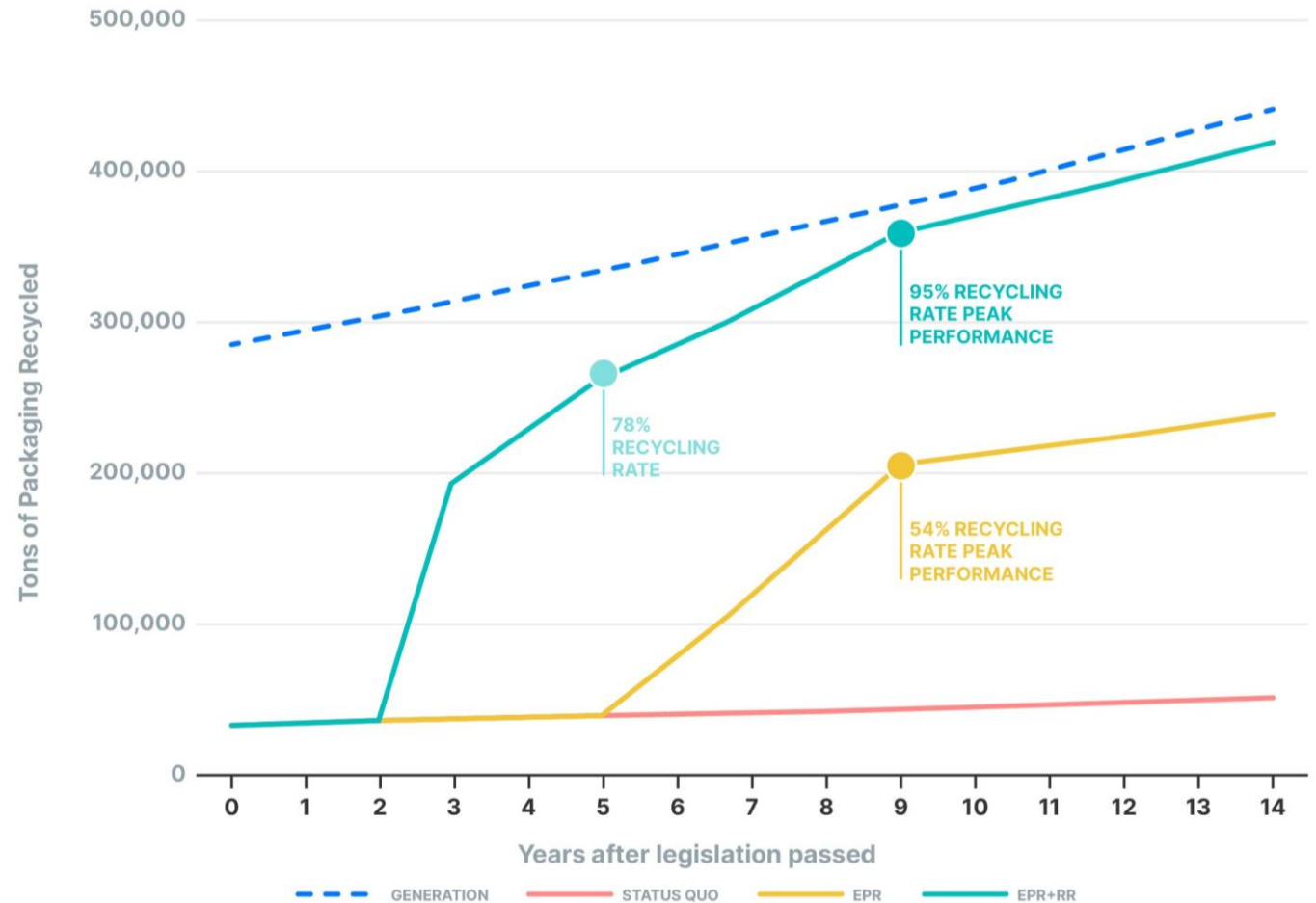
EPR alone is estimated to achieve a peak recycling rate of 54% within 9 years

However, EPR+RR leads to accelerated progress:

- 78% recycling rate by year 5
- 95% recycling rate by year 9

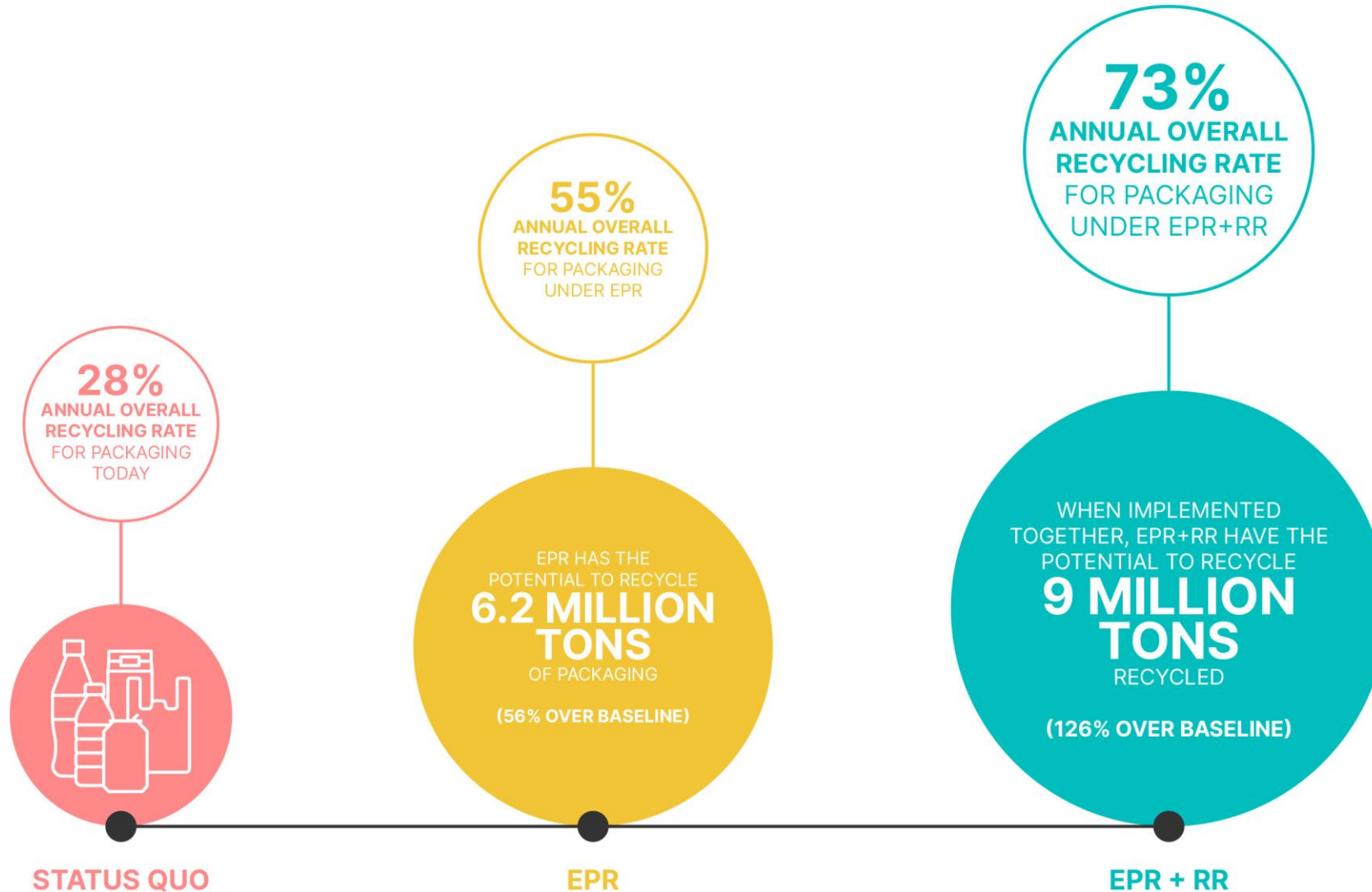
Due to the implementation timeline differences – RR would recycle approximately 571,000 more tons of packaging material before the full effects of EPR investment are realized.

## Impact of Policy on Beverage Container Recycling in Colorado



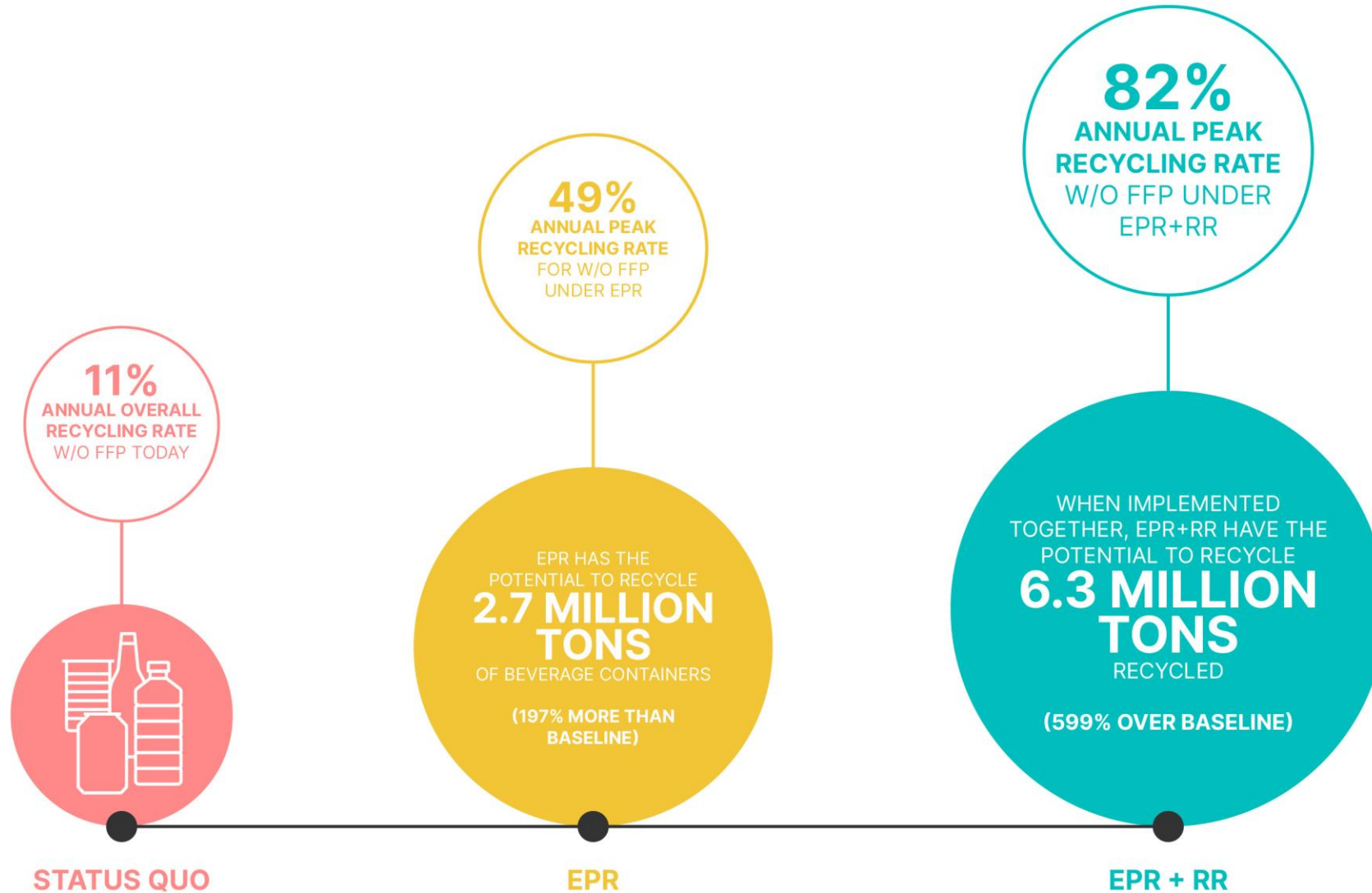
THE 50 STATES OF RECYCLING

# IMPACT OF POLICY ON CUMULATIVE TONS RECYCLED OVER 15 YEARS (INCLUDING FFP)

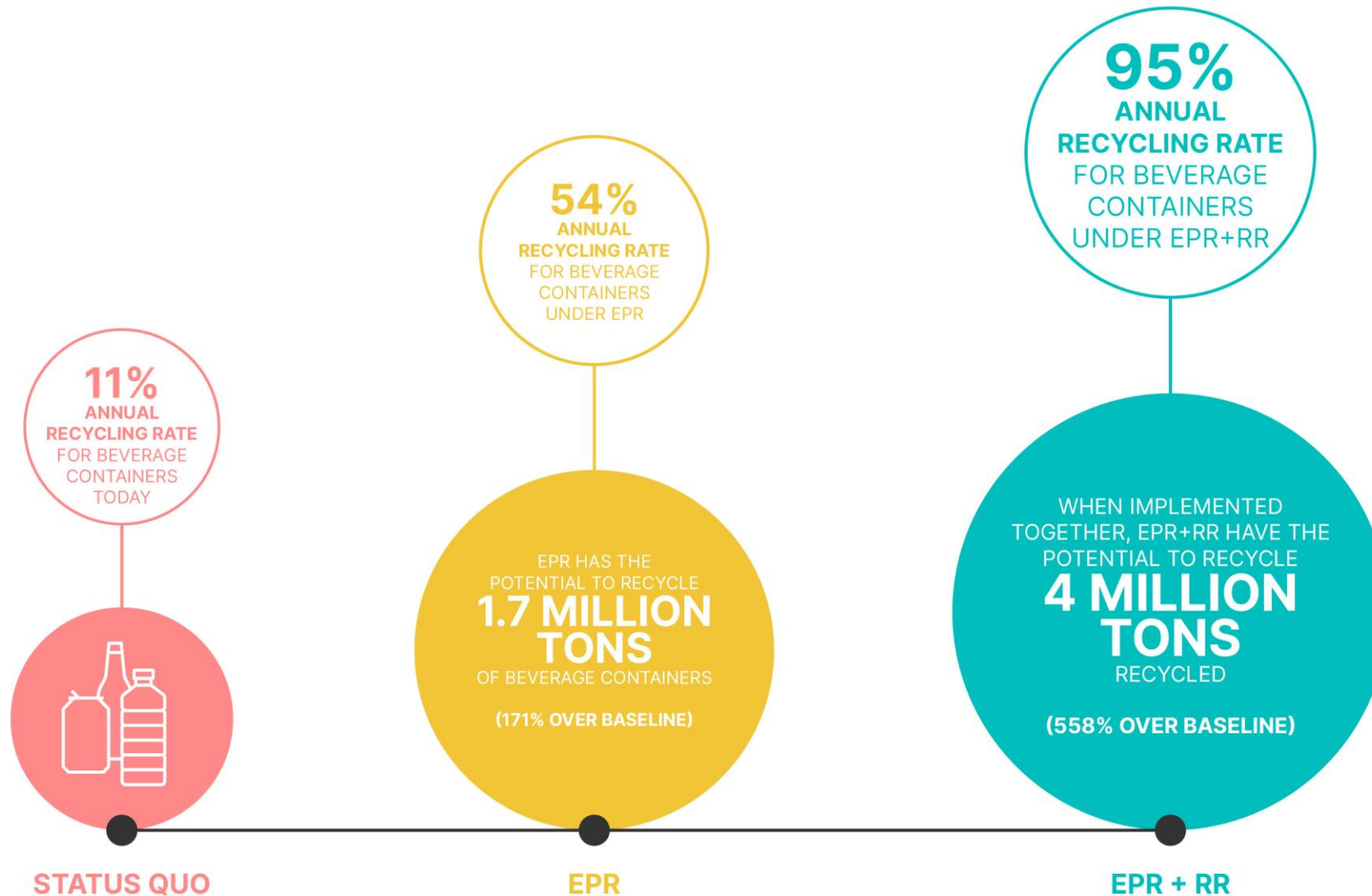




# IMPACT OF POLICY ON CUMULATIVE PACKAGING TONS RECYCLED OVER 15 YEARS (EXCLUDING FFP)



# IMPACT OF POLICY ON CUMULATIVE BEVERAGE CONTAINER TONS RECYCLED OVER 15 YEARS



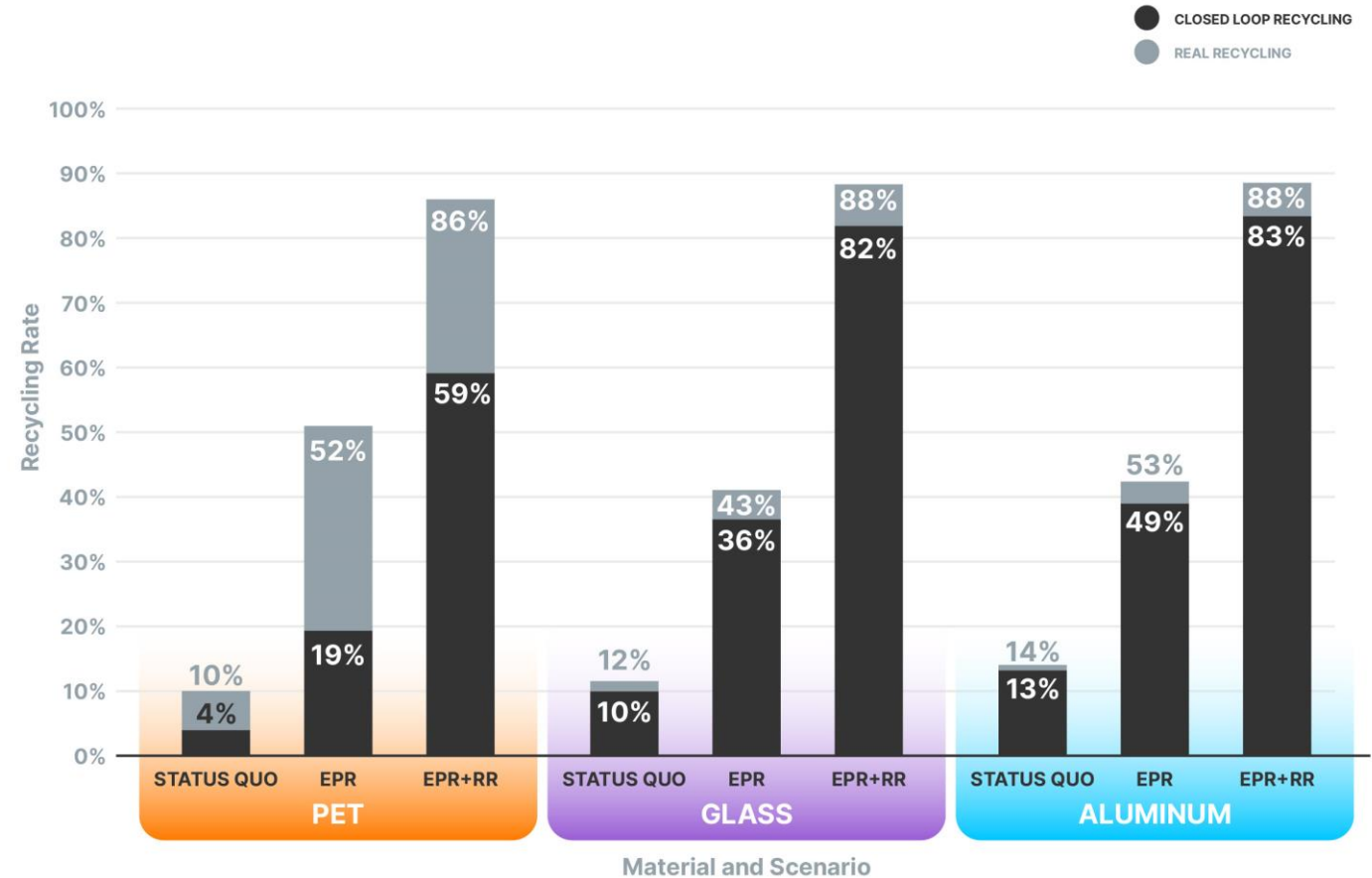
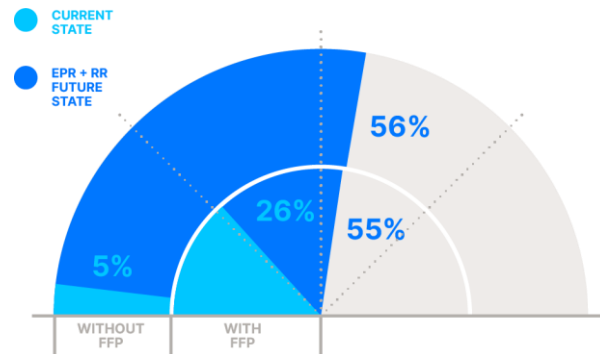
# CLOSED LOOP RECYCLING AND MATERIAL VALUE CAPTURED UNDER DIFFERENT POLICY SCENARIOS

## CLOSED-LOOP RECYCLING IMPACTS

A system with RR creates a less contaminated material stream that enables more closed-loop recycling for beverage containers specifically.

- At full implementation, EPR alone improves the amount of packaging recycled in a closed-loop process by approximately 77,000 tons. (271% over the status quo).
- EPR + RR increases this amount by 140,100 tons (7x the status quo) due to greater capture rates for beverage containers under RR and the addition of commercial beverage container tonnage.

Closed Loop Recycling Under Different Policy Scenarios



Beverage Container Material Recycled in a Closed-Loop Process Under Different Policy Scenarios in Colorado



# COLORADO

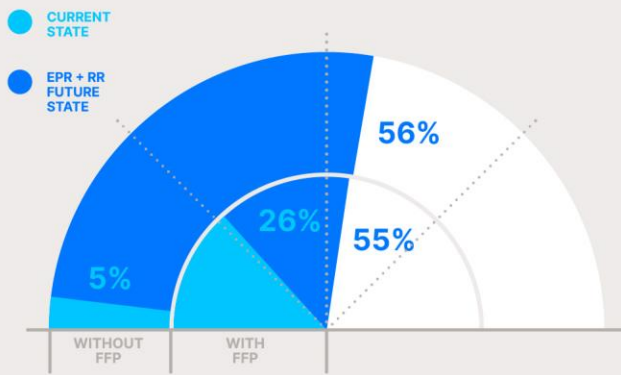
## CURRENT STATE OF RECYCLING

- In 2021, Colorado recycled approximately 11% of packaging materials without FFP. This recycling performance increases to 29% when considering materials with FFP.
- The value of the material captured for recycling was \$45 million, just 24% of the total value of material that could be captured for recycling.
- Recycling in the state avoided GHG emissions of 1.1 million MTCO<sub>2</sub>e.

## OUTCOMES EPR+RR

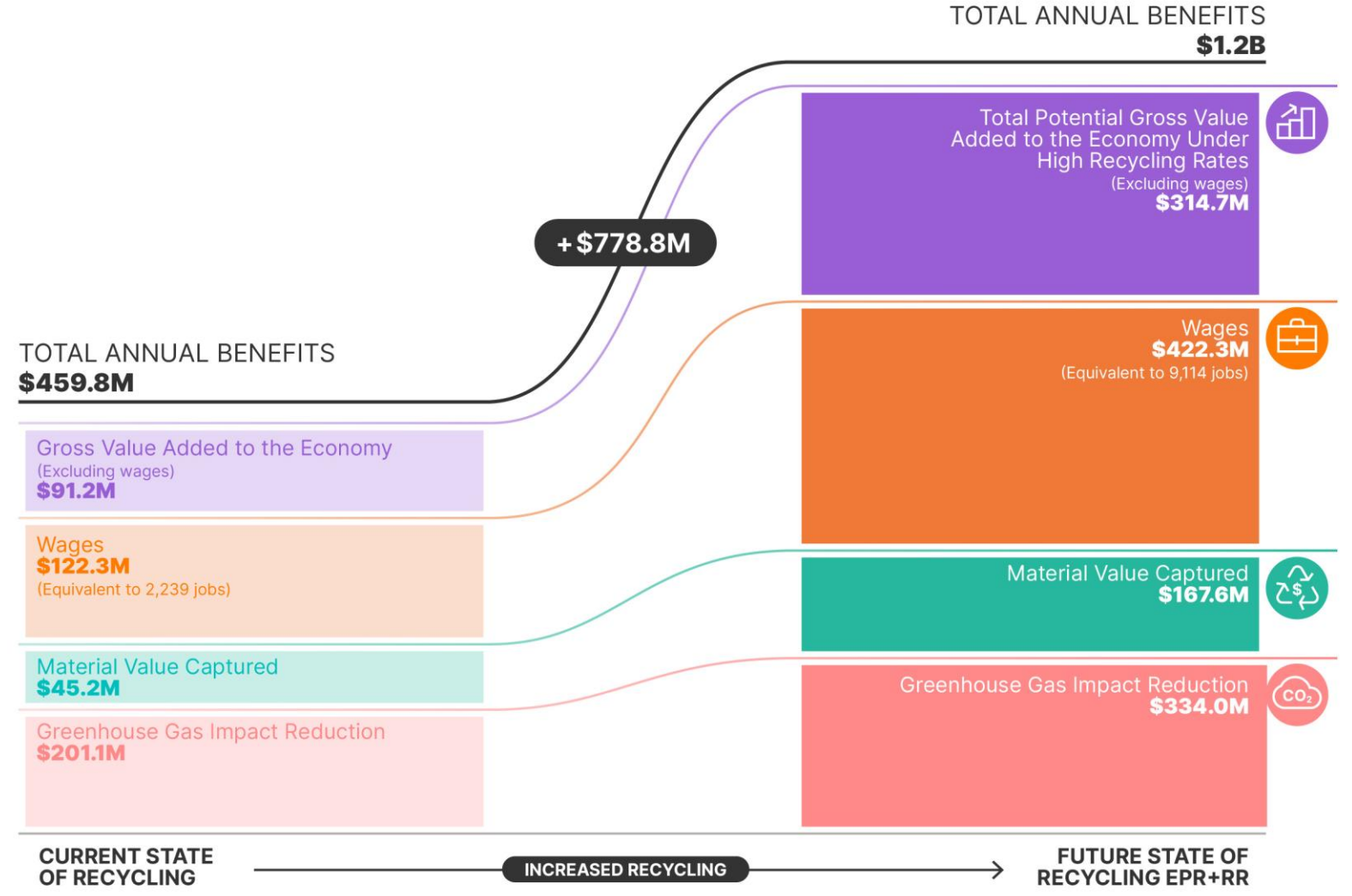
- Extended Producer Responsibility and Recycling Refund policy together could:
- Increase recycling related jobs from 2,200 to 9,100.
  - Place \$168 million of recycled material back in the market to support a circular economy and reduce the need for virgin material.
  - Avoid emissions of 1.8 million MTCO<sub>2</sub>e annually.

## CLOSED-LOOP IMPACTS



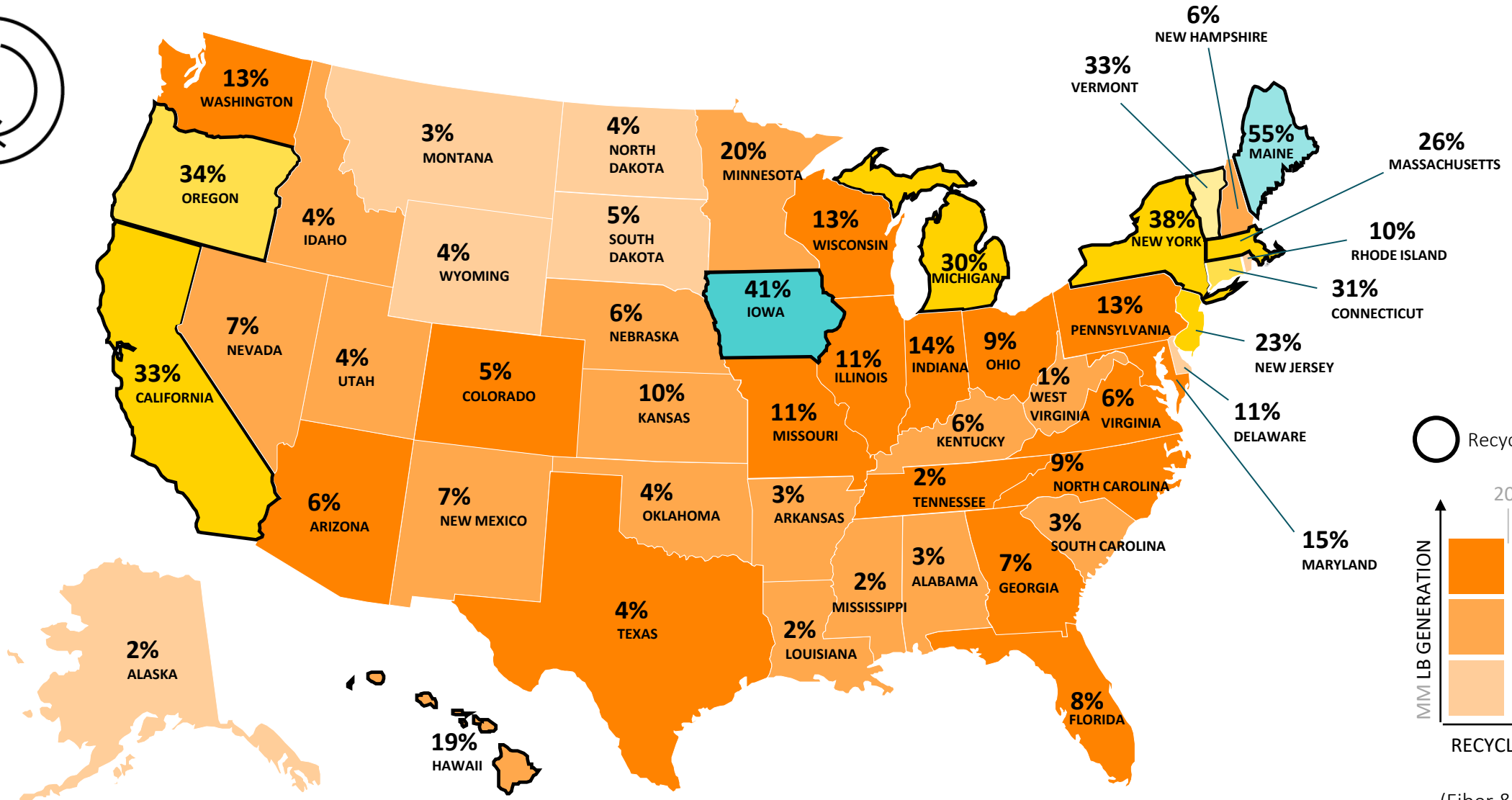
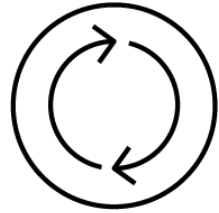
## THE ECONOMIC AND ENVIRONMENTAL OUTCOMES OF WELL-DESIGNED EXTENDED PRODUCER RESPONSIBILITY (EPR) + RECYCLING REFUND (RR) PROGRAMS

EPR assumes an overall recycling rate of 65% for residential packaging and RR assumes a 90% recycling rate for beverage containers

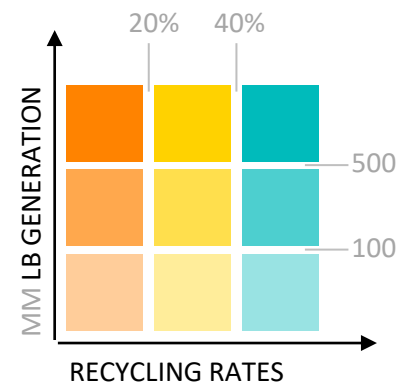




# CURRENT CLOSED LOOP RECYCLING (%) W/O FFP

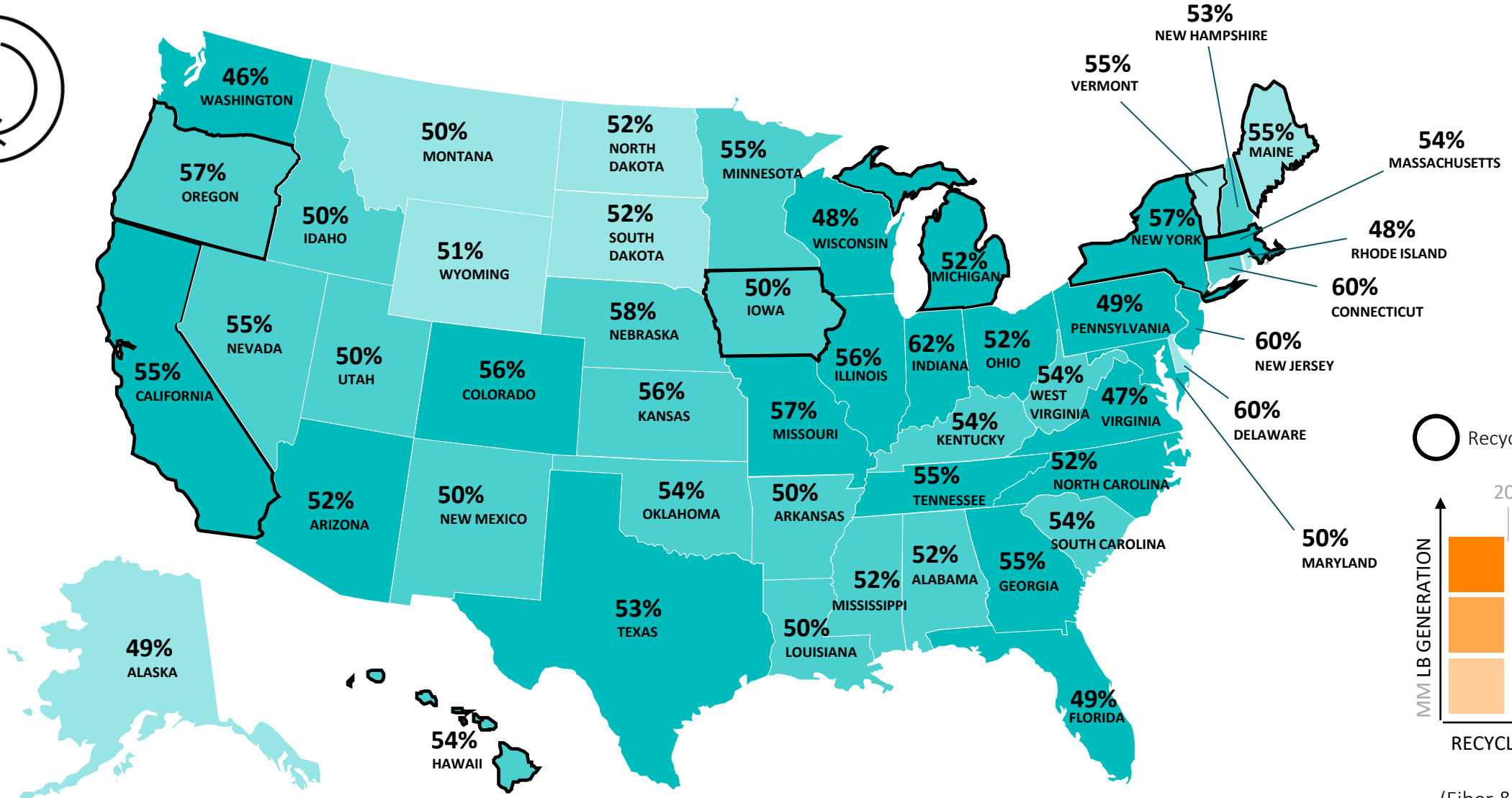
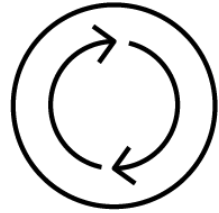


Recycling Refund State

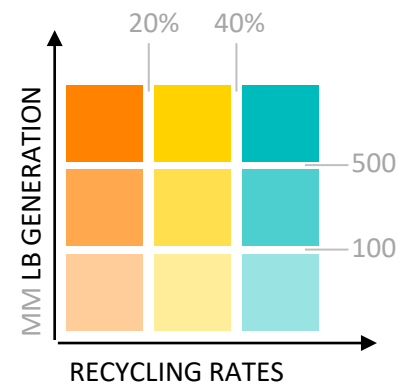


\*Excludes FFP (Fiber & Flexible Plastics)

# FUTURE STATE EPR+RR: CLOSED LOOP RECYCLING (%) W/O FFP



Recycling Refund State



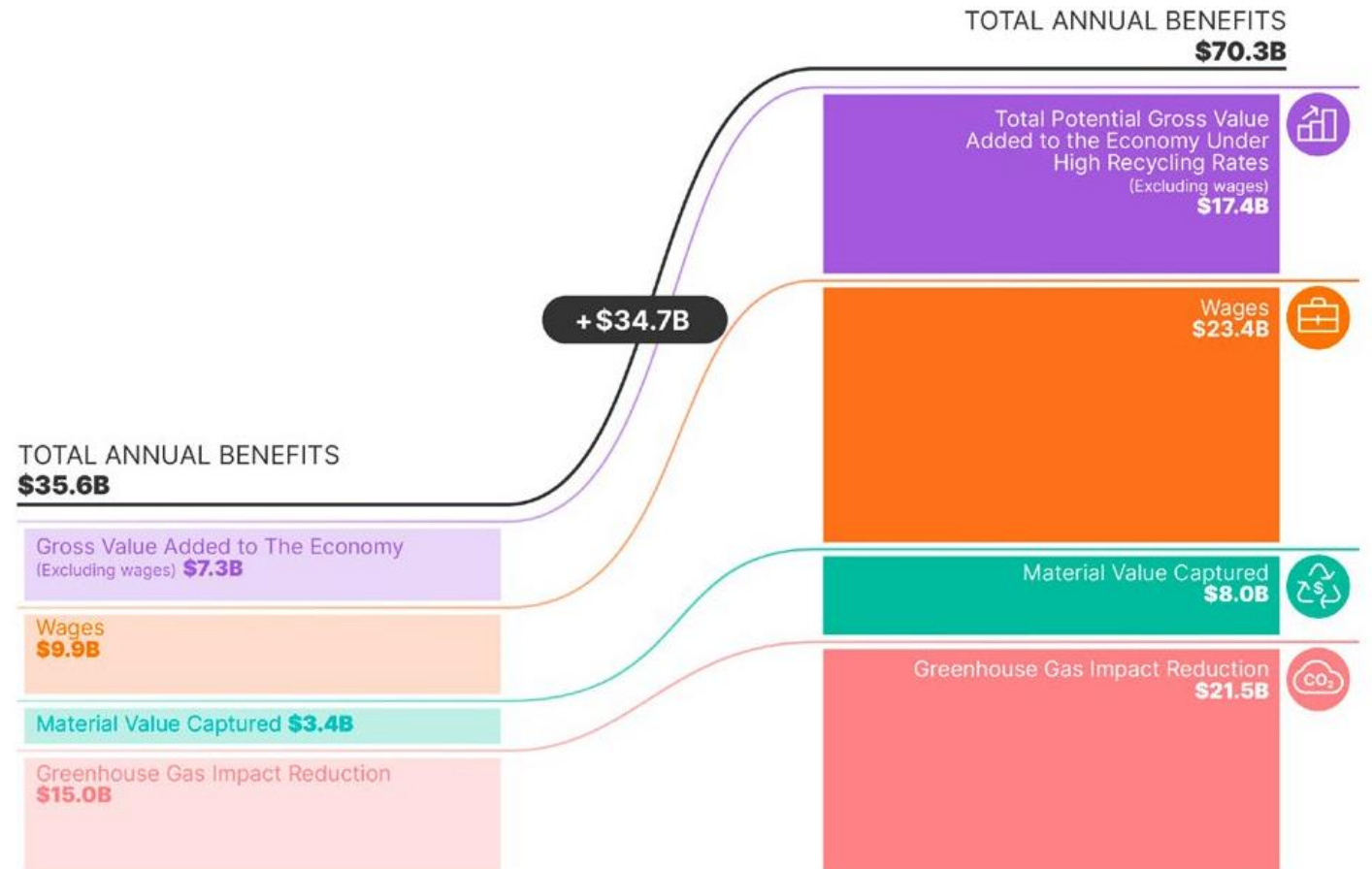
\*Excludes FFP (Fiber & Flexible Plastics)

# ECONOMIC & ENVIRONMENTAL OUTCOMES OF WELL-DESIGNED EPR+RR AT A NATIONAL LEVEL

Nationally a 24% recycling rate provide approximately \$35 billion in economic and environmental benefits annually.

If effective recycling policies were enacted nationwide such as pairing **Extended Producer Policy alongside Recycling Refunds** the benefit of recycling would double to \$70 billion

- EPR assumes a 65% overall recycling rate for residential packaging
- RR assumes a 90% recycling rate for all beverage containers



# CONCLUSIONS FOR POLICY MAKERS

## RECYCLING REFUND STATES REPRESENT

- 9 of the top 10 states with the highest recycling rates
- Only represent 27% of the nation's population, but account for 51% of all beverage containers recycled nationally
- RR States currently recycle 49% of all beverages containers in a closed-loop (e.g. can-to-can & bottle-to-bottle) compared to 7% in non-RR States.
- Despite high performance RR States need policy modernization in order to maximize efficiencies and achieve higher performance.



## BENEFITS OF EPR+RR POLICY APPROACH

- EPR can be an important first step to increasing recycling rates for beverage packaging – but EPR + RR will lead to the best outcomes if implemented together.
- RR can accelerate to high recycling rates (90%+) within the first 2-3 years of implementation
- EPR can take up to 5-8 years to achieve peak recycling rates - roughly 65%
- Implementing both EPR + RR together will maximize closed loop recycling, GHG emission reductions, and economic benefits

## EMPOWERING CHANGE

- This is the first report the models the outcomes recycling policies - comparing EPR Only vs. EPR+RR.
- This report should serve as a resource for shaping well-crafted recycling policies and developing beneficial programs for the future.
- We hope this data and analysis will help equip policy makers and industry partners with the information needed to maximize economic, social, and environmental outcomes





# THANK YOU

## Forward-Looking Statements

This release contains "forward-looking" statements concerning future events and financial performance. Words such as "expects," "anticipates," "estimates," "believes," and similar expressions typically identify forward looking statements, which are generally any statements other than statements of historical fact. Such statements are based on current expectations or views of the future and are subject to risks and uncertainties, which could cause actual results or events to differ materially from those expressed or implied. You should therefore not place undue reliance upon any forward-looking statements, and they should be read in conjunction with, and qualified in their entirety by, the cautionary statements referenced below. Ball undertakes no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise. Key factors, risks and uncertainties that could cause actual outcomes and results to be different are summarized in filings with the Securities and Exchange Commission, including Exhibit 99 in Ball's Form 10-K, which are available on Ball's website and at [www.sec.gov](http://www.sec.gov). Additional factors that might affect: a) Ball's packaging segments include product capacity, supply, and demand constraints and fluctuations and changes in consumption patterns; availability/cost of raw materials, equipment, and logistics; competitive packaging, pricing and substitution; changes in climate and weather and related events such as drought, wildfires, storms, hurricanes, tornadoes and floods; footprint adjustments and other manufacturing changes, including the startup of new facilities and lines; failure to achieve synergies, productivity improvements or cost reductions; unfavorable mandatory deposit or packaging laws; customer and supplier consolidation; power and supply chain interruptions; changes in major customer or supplier contracts or loss of a major customer or supplier; inability to pass through increased costs; war, political instability and sanctions, including relating to the situation in Russia and Ukraine and its impact on Ball's supply chain and its ability to operate in Europe, the Middle East and Africa regions generally; changes in foreign exchange or tax rates; and tariffs, trade actions, or other governmental actions, including business restrictions and orders affecting goods produced by Ball or in its supply chain, including imported raw materials; b) Ball's aerospace segment include funding, authorization, availability and returns of government and commercial contracts; and delays, extensions and technical uncertainties affecting segment contracts; failure to obtain, or delays in obtaining, required regulatory approvals or clearances for the proposed transaction; any failure by the parties to satisfy any of the other conditions to the proposed transaction; the possibility that the proposed transaction is ultimately not consummated; potential adverse effects of the announcement or results of the proposed transaction on the ability to develop and maintain relationships with personnel and customers, suppliers and others with whom it does business or otherwise on the business, financial condition, results of operations and financial performance; risks related to diversion of management's attention from ongoing business operations due to the proposed transaction; the impact of the proposed transaction on the ability to retain and hire key personnel; and c) Ball as a whole include those listed above plus: the extent to which sustainability-related opportunities arise and can be capitalized upon; changes in senior management, succession, and the ability to attract and retain skilled labor; regulatory actions or issues including those related to tax, environmental, social and governance reporting, competition, environmental, health and workplace safety, including U.S. Federal Drug Administration and other actions or public concerns affecting products filled in Ball's containers, or chemicals or substances used in raw materials or in the manufacturing process; technological developments and innovations; the ability to manage cyber threats; litigation; strikes; disease; pandemic; labor cost changes; inflation; rates of return on assets of Ball's defined benefit retirement plans; pension changes; uncertainties surrounding geopolitical events and governmental policies, including policies, orders, and actions related to COVID-19; reduced cash flow; interest rates affecting Ball's debt; successful or unsuccessful joint ventures, acquisitions and divestitures, and their effects on Ball's operating results and business generally; and potential adverse effects of the announcement or results of the proposed transaction on the market price of Ball Corporation's common stock.