Washington Recycling, Reuse, and Source Reduction Target Study and Community Input Process

Report to the Washington State Legislature

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Report For

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Executive Summary

In 2023, the Washington State Legislature directed the Washington Department of Ecology (Ecology), via the Engrossed Substitute Senate Bill 5187, Section 302 (20), to contract for a study to (1) develop recycling, reuse, and source reduction performance target rates for consumer packaging and paper materials; and (2) conduct a community input process to gather input from Washington residents about their views and opinions on the state's recycling system.[i]

This study addresses consumer packaging material, and specifically, rigid and flexible plastic, paper, aluminum, steel, and glass. Ecology awarded this contract to a team led by Eunomia Research & Consulting, Inc. This report is required to be delivered to the appropriate committees of the Washington State Legislature by December 1, 2023.

I. Targets Study

The targets study comprises two parts: (1) a summary of recycling, reuse, and source reduction target rates set by jurisdictions, primarily in the US, Canada, and Europe, including information about measurement methods and justifications for the target rates; and (2) findings from modeling the impact of four policy scenarios on recommended target recycling and reuse rates for the near-term, 2032, and beyond.

Targets in Other Jurisdictions

Research into existing recycling, reuse, and source reduction targets informed the rates used in the target modeling. Even if these targets are not currently achievable in Washington, their existence in other jurisdictions may make them more likely to be achievable statewide under the policies used in the modeling analysis. The figure below offers a summary of research findings and implications for development of the model.

Figure 1: Summary of Findings from Targets Research

Typically, targets are staggered and designed to **ramp up over time**. Many have an initial short-term target in the late 2020s and early 2030s and a long-term target set for after 2040 to 2060.

Recycling and source reduction targets tend to be both **material specific** (plastic, PET, glass, etc.) and **product use specific** (beverage containers, transport packaging, etc.). Reuse targets are almost exclusively product use specific.

Established measurement methods exist **for recycling rates**, while calculation methods for **source reduction and reuse targets** are currently **in development** for most jurisdictions.

The justification for targets is rarely public as they are usually the **product of compromise** between advocates, policymakers, and industry.

Policy Scenarios

The project team modeled four different policy scenarios for Washington using 2021 baseline data, assuming a set of policy actions, and assessing anticipated impacts by 2032. The four scenarios were created by combining the following policy interventions in differing ways:

- **Extended producer responsibility** (EPR) provides a uniform list of materials to be collected and processed by the recycling system and mandates convenient recycling services statewide, including expanded curbside service. The scenario assumes certain investments that will improve effectiveness.

- **Deposit return system** (DRS) provides separate collection and an incentive for consumers to recycle beverage containers. This results in an increase in return rates for beverage containers which are under the covered materials: container glass, aluminum beverage containers (UBCs), PET and some HDPE beverage containers, and beverage cartons.

- **Post-consumer recycled content** (PCR) provides market demand for higher quantity of plastic PCR for manufacturing; this results in improvements to plastic sorting efficiencies, as material recovery facility (MRF) operators invest in equipment to capture as much of the material in high demand as possible.

- **Truth-in-labeling** regulation aims to prevent false recyclability claims on packaging and thereby reduce contamination within collected recyclables.

- **Reuse targets** incentivize the growth of reuse systems, resulting in a percentage of product uses switching to reuse, which offsets the use of the corresponding single-use alternatives.

Table 1 presents the four modeled scenarios.

Table 1: Four Scenarios and Associated Policy Mechanisms

Policy Mechanism	Scenario 1	Scenario 2	Scenario 3	Scenario 4[a]
Extended Producer Responsibility (EPR)	☑	☒	☑	☒
Deposit Return System (DRS)	☑	☑	☒	☒
Post-consumer Recycling (PCR) Rate Targets[b]	☑ Expanded	☑ Current	☑ Current	☑ Expanded
Truth-in-labeling	☑	☑	☑	☑
Reuse Targets	☑	☑	☑	☒

[a] In Scenario 4, the policies adopted rely on market mechanisms to drive improvements to recycling outcomes.

[b] Washington has already taken policy action to improve recycling of plastics through recycled content requirements (RCW 70A.245) and expansion of recycled content requirements for plastic packaging was a top recommendation from the 2020 Plastic Packaging Study.

Highest Achievable Performance Rates and Recommended Targets

- **Recycling**. Figure 2 presents the results of each modeled scenario and the recommended recycling rate targets under each. Scenario 1 (comprehensive policy) would result in the highest recycling rate rates, followed by Scenario 3 (EPR focused), Scenario 2 (DRS focused), and Scenario 4 (market-driven policy). Table 2 shows the recommended 2032 recycling target rates for each scenario. These recommendations are based on the modeling done for this study and informed by recycling targets and actual performance in other jurisdictions. Under scenarios with EPR or DRS, the packaging producers (grouped as a Producer Responsibility Organization) would be responsible for achieving target rates for the products covered by the policy. However, under Scenario 4, policy would not designate any enforcement mechanism or responsible party, making it arguably less likely that Washington would meet the targets set in that scenario.

Figure 2: Overview of Scenarios Modeled and Highest Achievable Recycling Rates by 2032

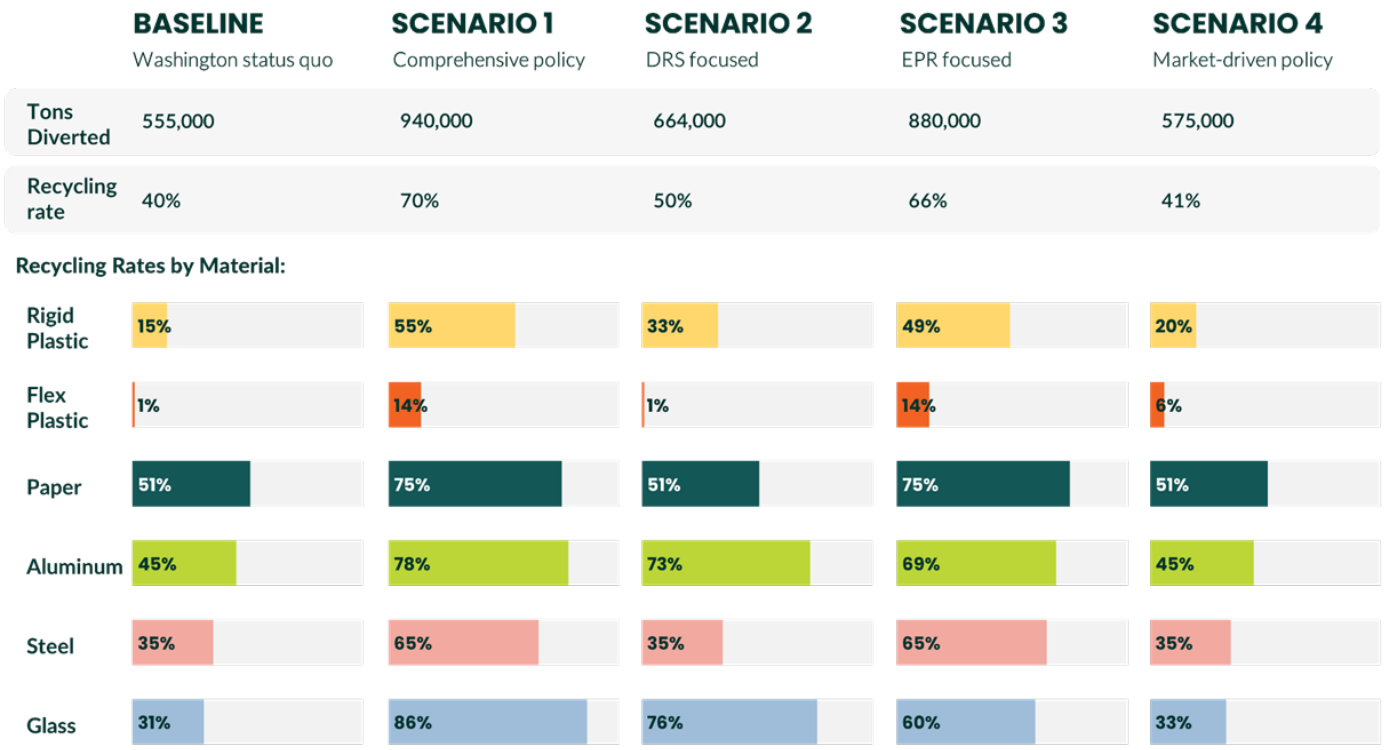


Table 2: Recommended Recycling Targets for 2032 by Scenario

Material	Current Rates	Scenario 1 – Comprehensive Policy	Scenario 2 – DRS Focused	Scenario 3 – EPR Focused	Scenario 4 – Market-Driven Policy
Rigid Plastic	15%	60%	35%	50%	19%
Flexible Plastic	1%	20%	5%	20%	5%
Paper	51%	80%	55%	80%	51%
Aluminum	45%	75%	70%	70%	45%

Material	Current Rates	Scenario 1 – Comprehensive Policy	Scenario 2 – DRS Focused	Scenario 3 – EPR Focused	Scenario 4 – Market-Driven Policy
Steel	35%	70%	40%	70%	35%
Glass	31%	80%	75%	60%	33%

- **Reuse**. Outside the modeled scenarios, the recommended reuse target for Washington of 5% for 2032 is in line with other jurisdictions and achievable based on the modeling. The project team modeled reuse at the product level (for example, glass beverage bottles) to allow for more accurate material flows, but the recommended rate is set at the overall packaging level (for example, all beverage containers). An overall reuse rate enables efficient analysis of how the target would impact the waste stream as a whole. Furthermore, setting an overall reuse target was preferable to a product level target, as there are an unknowable number of products and packaging types which could transition to reuse systems at various rates, depending on the available reuse infrastructure and market readiness.

- **Source Reduction.** As part of the jurisdictional research, Eunomia researched source reduction targets and examples associated with packaging and single-use plastic. However, source reduction targets are not provided as part of the modeling process, largely because of minimal data available associated with source reduction targets set in other jurisdictions. Additionally, many source reduction targets in other jurisdictions do not specify which packaging products must be source-reduced, only that the overall weight must be source-reduced. While there is interest in legislation to support source reduction via elimination of product components without replacement, there is a lack of clarity on how to model this for products broadly. This general lack of clarity means that source reduction targets were ultimately not feasible to model.

Study Constraints

While this study provides valuable results that inform target recommendations, it is essential to acknowledge the model limitations. Key limitations include limited sales data for reuse-eligible products, the lack of data on existing reuse systems in Washington State, the limitation of the study to the residential sector, and the limited data on the progress and expansion of reuse systems over time.

II. Community Input Process

The community input process involved a survey and a direct public engagement effort; these aimed to solicit feedback from a representative sample of Washington residents, including overburdened communities. The purpose of this work was to generate an improved understanding of public values and opinions related to the state's recycling system, the current public experience with the state's recycling systems, and ways the public believes that their recycling experience and system outcomes could be improved. The following objectives steered the community input process:

1. Conduct an equitable, inclusive, and transparent statewide community input process to elicit an understanding of public values, opinions, and experience with respect to the recycling systems in Washington and ways the public believes that their recycling experience and system outcomes could improve.

2. Understand Washington residents' opinions as well as perceived barriers around DRS, reuse, and source reduction.

Survey

The project team conducted an online survey of adults currently living in Washington between September 18 and October 9, 2023, in both English and Spanish and achieved a total of 2,231 responses. The 10 to 12-minute survey aimed to address the following key objectives:

- Gather information about respondents' current perceptions of recycling and their recycling service (or lack thereof).
- Uncover barriers and motivators to recycling and using curbside recycling services (where applicable).
- Identify challenges and points of confusion and concern over the recycling process and system.
- Identify respondents' willingness to participate in a Deposit Return System (referred to as beverage container recycling program to survey respondents) as well as challenges and perceptions.
- Gather information about the degree of support for producer responsibility policies designed to reduce waste and improve recycling, with a focus on packaging.
- Identify differences among individuals in multi-family and single-family households, and among individuals with and without current curbside recycling availability or subscriptions.

To ensure the survey captured feedback from overburdened and/or vulnerable populations, as well as from households with varying levels of access to recycling, reuse, and waste prevention programs, the team prioritized recruitment of people from Spanish-speaking households, households with no recycling services available, individuals who identify as Black, Indigenous, People of Color (BIPOC), and households in Eastern Washington.

The survey team used three strategies to recruit participants: (1) partnering with market research panel providers to help capture a representative sample in the state of Washington; (2) communicating about the survey at in-person engagement events; and (3) sharing the survey link via Ecology's partners and Washington county partners to leverage any community relationships that align with the purpose of the research. As incentives to participate, respondents from the first recruiting stream received points which could be turned into cash value as part of their agreement with the panel partner. The first 875 participants from the second and third stream (in-person event and partner links) received $10 incentives.

Following data cleaning, a survey of demographic data found there were ways it both aligned with and diverged from the overall demographics of Washington State. Spanish respondents aligned well, as 9% of survey respondents answered in Spanish; this is equivalent to the percentage of Spanish-speaking people in the state. White, BIPOC, and Hispanic or Latino respondents made up four or fewer points of the percentages across the state. On the other hand, age was slightly skewed toward 25- to 44-year-old people, education was slightly skewed toward college-educated respondents, and income was skewed more toward those making $25,000 to $75,000, which is higher than the state's population in that bracket (47% in the survey response versus 32% state-wide).

Survey Key Findings. Below is a summary of key findings from the survey:

- Recycling is important to a majority of Washington residents (76%).

- Washington residents support the value of recycling and believe in convenient access to recycling for all residents. (Agreement with: access to convenient recycling options (86%), importance of reducing waste (86%), ability for everyone to be able to recycle the same items (82%), recycling should be free for everyone in WA (78%)).

- Washington residents willingly participate in recycling in the manner that is available to them.

- Single-family residents who have curbside service have mixed feelings about the service.
- Multi-family residents rate the consistency and convenience of their current recycling lower than single-family residents.
- Across populations, residents express similar ratings on their satisfaction with their recycling service.
- Among those residents that do not currently have recycling service at their residence, the vast majority would participate in a free recycling program at their residence if it were available to them.
- Both single- and multi-family residents identify additional barriers to recycling, whether they have a current recycling service or not.
- Residents strongly support EPR concepts.
- Residents indicate a strong likelihood of participating in the concept of a DRS (referred to as a beverage container deposit program in the survey) (with 70% likely to participate).
- A DRS program would need to be geographically convenient for residents to consistently participate.
- About a quarter of Washington residents indicated through comments that they would like to have additional information before they can determine whether they would support a beverage container deposit program.

Direct Public Engagement

Qualitative, direct community engagement took place between early September and early October 2023. This engagement included in-person outreach, conducted via community engagement booths at local fairs and festivals and major grocers across the state of Washington. To ensure meaningful participation and gather comprehensive insights, during the outreach planning phase, the project team identified key audiences for in-person participation, with an emphasis on historically underrepresented communities. These include low-income communities, communities of color, indigenous communities, rural communities, and generally underrepresented communities.

The seven outreach events conducted together reached over 430 community members. After engaging with hundreds of residents across the state, from those in dense, urban settings in the Puget Sound to remote, rural communities on the Colville Reservation, the themes below came into focus:

- Confusion over what can and cannot be recycled and frustration with the lack of consistency in recycling services across municipalities.
- Care about recycling and belief in its importance.
- Belief that producers should at least be partially accountable for recycling their product's packaging.
- Desire for increased transparency about what actually gets recycled, what ends up in landfills, and where it all winds up.
- Desire for curbside recycling services, and for these to include more types of materials such as glass and plastic.

- Openness to the idea of a deposit return system, with interest in opportunities for input and more information.
- Enthusiasm for the ability to use reusable and refillable containers at stores.
- Desire for recycling services to be convenient, easy to understand, and affordable.
- Requests for additional educational resources on what is recyclable, so people can feel confident that they are recycling correctly.

While a virtual listening session also gathered feedback, it has not been incorporated into this report because it was found to be unreliable: the project team could not adequately verify the eligibility of the 30 people invited to participate, specifically their locations.

Study Constraints

A challenge for this study was the very short timeframe for thoughtful engagement with underserved and underrepresented communities. Relationship-building is key to engaging many frontline and/or overburdened communities. In the project team's experience, it takes eight to 12 months to conduct a fully accountable, transparent, culturally relevant, and holistically equitable community input process that reaches all communities and allows sufficient time for effective engagement planning, implementation, and reporting. Therefore, the findings of the community input process may not reflect or represent the full range of Washington residents' values, opinions, and experiences with respect to state recycling systems, or residents' thoughts and perceived barriers around reuse and source reduction.

Acronyms

Acronym	Meaning
ADC	Alternate daily cover
BC	British Columbia
BLS	Bureau of Labor Statistics
BEA	Bureau of Economic Analysis
BIPOC	Black, Indigenous, People of Color
BMDA	Beverage Market Data Analysis
CBO	Community-based organizations
COICOP	Classification of Individual Consumption According to Purpose
CPI	Consumer Price Index
CPPP	Consumer packaging and paper products
DRS	Deposit return system
EPR	Extended producer responsibility
EPS	Expanded polystyrene
EU	European Union
HDPE	High density polyethylene
LDPE	Low density polyethylene
LLDPE	Linear low-density polyethylene
MF	Multi-family
MRF	Material recovery facility
OCC	Old corrugated cardboard
PCR	Post-consumer recycled content
PE	Polyethylene
PET	Polyethylene terephthalate
PLA	Polylactic acid (compostable packaging)
PP	Polypropylene
PRO	Producer responsibility organization
PS	Polystyrene
PVC	Polyvinyl chloride
SF	Single-family
SUP	Single-use plastic
UBC	Used beverage can
WACSWM	Washington Association of Counties Solid Waste Managers

1.0 Overview of Legislative Directive

In 2023, the Washington State Legislature directed the Washington Department of Ecology (Ecology), via the Engrossed Substitute Senate Bill 5187 Section 302 (20), to contract for a study that (1) develops recycling, reuse, and source reduction (achieved solely by eliminating plastic components) performance target rates for consumer paper and packaging material; and (2) a community input process to gather input from Washington residents about the state's recycling system. The study covers packaging material made of rigid and flexible plastic, paper, aluminum, steel, and glass. Ecology awarded this contract to a team led by Eunomia Research & Consulting, Inc. This is the resulting report, delivered to the State Legislature on December 1, 2023.

The legislative language directing this study is as follows:

> (29)(a) $500,000 of the model toxics control operating account— state appropriation is provided solely for the department to carry out the following activities to inform the development of legislative proposals to increase recycling, reuse, and source reduction rates, which must include consideration of how to design and implement a producer responsibility model for consumer packaging, including paper, plastic, metal, and glass, and paper products:
>
> > (i) Conduct a recycling, reuse, and source reduction targets study; and
> >
> > (ii) Carry out a community input process on the state's recycling system.
>
> (b) The department must contract with an impartial third-party consultant with relevant technical expertise and capabilities in facilitation and gathering public input, including from overburdened communities, to carry out the activities specified in (a) of this subsection. In order to ensure that the state is receiving a variety of expert perspectives on the topic of packaging management, the contractor should include in their team individuals and/or subcontractors with a wide range of expertise and experience. The third-party consultant must submit a report to the appropriate committees of the house of representatives and the senate by December 1, 2023.
>
> (c) The recycling, reuse, and source reduction targets study must:
>
> > (i) Document recycling rates, reuse rates, and the reduction of single-use plastics for consumer packaging and paper products that have been adopted in other jurisdictions, measure methods used, and the basis or justification for recommended target rates selected;
> >
> > (ii) Recommend highest achievable performance rates, including an overall recycling rate, a separate specific minimum reuse rate, a recycling rate for each material category, and a source reduction rate to be achieved solely by eliminating plastic components, that could be achieved under up to four different scenarios, including a producer responsibility program and other policies; and
> >
> > (iii) Make recommendations that consider the commercial viability and technological feasibility of achieving rates based on current rates achieved in the state, rates achieved based on real world performance data, and other data, with performance rates designed to be achieved statewide by 2032.
>
> (d) For purposes of this subsection, "eliminate" or "elimination," with respect to source reduction, means the removal of a plastic component from a covered material without replacing that component with a non-plastic component.
>
> (e) The community input process on the state's recycling system must include:

(i) In-person and virtual workshops and community meetings held at locations in urban and rural areas and in ways that are accessible to stakeholders across the state, including overburdened communities;

(ii) Public opinion surveys that are representative of Washington residents across the state, including overburdened communities and urban and rural areas; and

(iii) A focus on eliciting an improved understanding of public values and opinions related to the state's recycling system, the current public experience with respect to the state's recycling systems, and ways the public believes that their recycling experience and system outcomes could be improved.

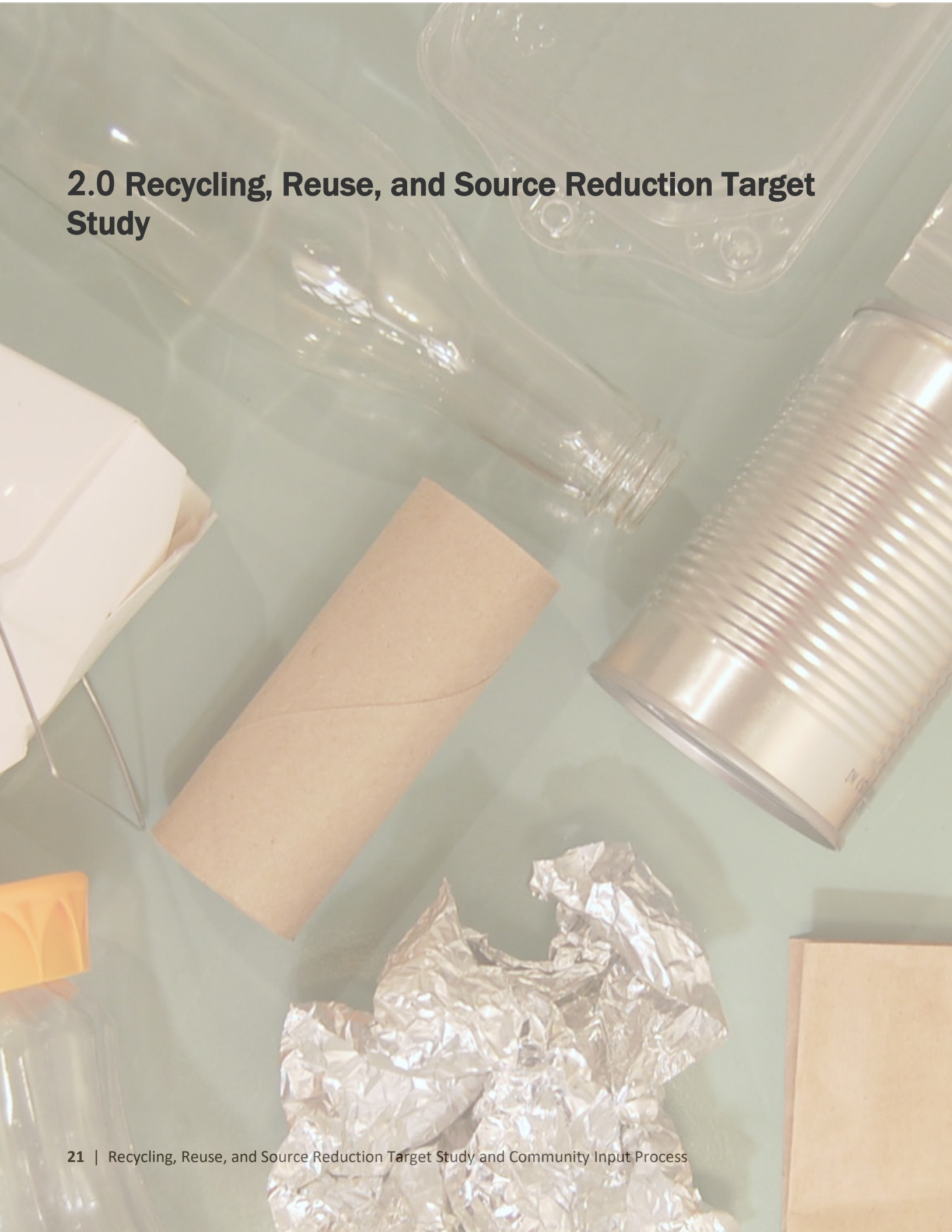
Eunomia Research & Consulting, Inc led the targets study. It presents the results of research documenting consumer packaging and paper product recycling and reuse rates adopted in other jurisdictions. It also includes measurement methods and justifications for target rates and documentation of source reduction actions applied to plastic components from single-use consumer plastic packaging. This research informed the subsequent modeling and recommendations for highest achievable recycling, reuse, and source reduction performance rates in Washington.

The study assessed the impact of four different policy scenarios in Washington using a 2021 baseline and estimating recycling rate impacts in 2032. The policy scenarios incorporate policy interventions such as extended producer responsibility (EPR), deposit return systems (DRS), post-consumer recycled content (PCR) rate targets, reuse targets, and more.

The goal of the community input process was to better understand public values and opinions related to recycling systems in Washington and ways the public believes their recycling experience and system outcomes could improve. This input process included a survey, direct public outreach in public spaces, and a listening session. The survey was conducted by C+C and the public engagement was conducted by Maul Foster & Alongi (MFA), both of which are businesses headquartered in Washington State. Overlying this work was advisory support from Start Consulting to ensure the survey and public engagement were strategically deployed via an equitable and inclusive process, and to improve the likelihood that the feedback received contributes to a representative sample of Washington residents' perspectives.

While conducting this study, Eunomia intentionally avoided engagement with stakeholders who might be affected by the findings and forwarded any direct inquiries to Ecology. Ecology provided all stakeholders who expressed interest with a draft of the study to review prior to its finalization.

2.0 Recycling, Reuse, and Source Reduction Target Study



2.1 Overview

This chapter summarizes the methodology and findings from the recycling, reuse, and source reduction study. Section 2.2 summarizes recycling, reuse, and source reduction target rates set by other jurisdictions, primarily in North America and Europe. The research also compiled information about measurement methodologies and justifications for the target rates. Sections 2.3 through 2.7 present the methodology and findings from modeling the impact of four policy scenarios on recommended target recycling and reuse rates. Note that the project team did not model source reduction, in large part because there are currently minimal data around and little justification for source reduction targets in other jurisdictions; this is described further in Section 2.2 and discussed again briefly at the start of Section 2.3. Lastly, Section 2.8 provides an overview of constraints and limitations of the target study.

2.2 Targets Research and Recommendations

To inform the policy scenario modeling and establish reasonable targets for recycling, reuse, and source reduction in Washington, it is helpful to understand target rates set by other jurisdictions. Furthermore, the calculation methodology and justification for choosing that rate can help to inform the target rates recommended for Washington. This section details the methodology employed and the findings for recycling, reuse, and source reduction targets in jurisdictions outside of Washington.

2.2.1 Methodology

Understanding the way jurisdictions measure and set recycling, reuse, and source reduction targets for consumer packaging materials will inform the development of such targets in Washington State. Eunomia conducted desktop research into legislation primarily focused on (but not limited to) the US, Canada, and Europe to gather data on existing targets. The study focused on these regions for several reasons:

- They share similarities in terms of waste generation patterns as well as collection and recycling infrastructure. For example, in most of these jurisdictions, curbside, depot/drop-off (a central aggregation location where generators can deliver their recyclables themselves), and deposit collection methods are the predominant means of collecting consumer packaging material.

- These jurisdictions have well-documented sources of data and have introduced Extended Producer Responsibility (EPR), Deposit Return Systems (DRS), source reduction and market-driven policies akin to those the Washington legislature has considered. For example, the European Union's 2018 revision of the Packaging and Packaging Waste Directive requires Member States to adopt national EPR programs for packaging by 2024.[2] Additionally, the Canadian provinces of Quebec, Ontario, and British Columbia have recently revised their EPR programs with new requirements and recycling targets. Simultaneously, four US states (California, Colorado, Maine, Oregon) have enacted EPR laws for consumer packaging since 2021, and these include recycling, reuse, and source reduction targets.

Eunomia reviewed EPR, DRS and PCR policies as well as broader circular economy policies and laws focused on reuse and waste reduction. The project team also collected data about target measurement methods, packaging type and material affected, justification for target rates, and target timelines, and leveraged the knowledge of in-house experts whose work is focused on North America and Europe.

EPR is a policy that transfers the financial and sometimes operational responsibility for managing a product's end-of-life to its producer. Eunomia researched all types of packaging policies, with the majority of identified targets associated with EPR legislation. This is because targets are an integral part of EPR programs and set an overarching goal while providing flexibility for innovative approaches to achieve them.

DRS, also known as a container deposit system or bottle bill, is a system that places a monetary deposit on a product. The consumer pays this deposit at the point of purchase and receives it as a refund after returning the product packaging to a designated location for recycling or reuse. Bottle bills are a proven method of achieving higher return and recycling rates, providing quality feedstock, and reducing litter. The infrastructure necessary to redeem beverage containers can also be leveraged to support the reverse logistics necessary for implementing reuse and refill systems. As a result, jurisdictions with DRS legislation can set targets for return rates, recycling rates, and reuse rates.

While the research on targets in other jurisdictions did not include Post-Consumer Recycled (PCR) content targets, the modeling incorporated PCR targets based on Washington's existing PCR content requirements, as well as an expanded list of covered products. Section 2.5 describes these in more detail.

2.2.2 Findings

The research into recycling, reuse, and source reduction targets informed the target modeling for Washington. Even if these targets are not currently achievable in Washington, their existence in other jurisdictions makes them more likely to be achievable in the state under similar policies. The figure below offers a summary of research findings and implications for development of the Washington model. Appendix A.1.1 provides detailed findings on these target rates, the research for which is described in this section.

Figure 3: Key Findings from Targets Research

	Key Findings	Implications for Washington
	Targets are staggered and designed to **ramp up over time**. Many have an initial shorter-term target in the late 2020s and early 2030s and a longer-term target set for after 2040 to 2060.	Provides a lower and upper range for target rates; sets a best in class versus conservative boundary.
	Recycling and source reduction targets tend to be both **material-specific** (plastic, PET, glass, etc.) and **product-specific** (beverage containers, transport packaging, etc.). Reuse targets are almost exclusively product-specific.	Provides guidance for which products and packaging may be covered.
	Established measurement methods exist for recycling rates, while calculation methods for **source reduction and reuse targets** are currently **in development** for most jurisdictions.	Definitions are sometimes ambiguous or non-existent; there is no standard.
	The justification for targets is rarely public, as they are usually the **product of compromise** between advocates, policymakers, and industry.	While final targets may ultimately be a product of compromise, this report documents the process of identifying recommended targets.

2.2.2.1 Recycling Targets

There are legislated recycling targets in Oregon, California, Ontario, Quebec, British Columbia, the European Union (EU), and France. All jurisdictions have targets that ramp up over time. While some jurisdictions have recycling targets for all packaging (e.g., EU, British Columbia, France), most targets are material-specific. Table 3 presents a summary of the findings. Details on recycling targets in each jurisdiction and links to the relevant legislation are included in the Appendix in Table 46.

Eunomia used product-specific recycling targets, identified through this exercise, as alternative capture rates for curbside collection for the modeled policy scenarios. These targets were also compared with recycling modeling results that were based on the highest reported capture rates currently in Washington, serving as a means of validation. Section 2.5 discusses this further.

Table 3: Recycling Targets in Select Jurisdictions

Jurisdiction	Recycling Targets				
	Product-specific	Material-specific	Staggered timeline	Calculation Methodology	Published Justification
California	☒	☑	☑	TBD**	☒
Oregon	☒	☑	☑	TBD**	☒
British Columbia	☑	☑ *	☒	☒	☒
Ontario	☑	☑	☑	☑	☒
Quebec	☑	☑	☑	☑	☒
EU	☑	☑	☑	☑	☒
France	☑	☑	☑	☑	☒

* BC's material-specific targets are set by the Producer Responsibility Organization (PRO) rather than the ministry. Once the targets are set in the plan, the ministry can choose to enforce them if they are not met.
** The methodology for determining whether a producer has met a recycling target will be determined through rulemaking.

Recycling Calculation Methodologies

Recycling targets have appeared in legislation for longer than reuse and source reduction targets, and there is more information detailing the measurement methodologies for such targets. Eunomia's review identified recycling targets set by British Columbia (BC), Ontario, Quebec, the European Union, California, and Oregon, as described in Table 4. While this section explores differing types of calculation methodologies, in this study the recycling rate metric used for modeling purposes is the material that leaves a sorting facility (or other consolidation point) and is sent for recycling. Recycling does not include waste-to-energy or alternate daily cover (ADC) for the model.

- British Columbia's recovery rate is calculated by summing the amount of packaging collected and dividing it by the amount of packaging produced. The province's Recycling Regulation requires producers to manage

collected packaging in adherence with the waste hierarchy, thereby privileging reduction, reuse, and recycling over energy recovery and disposal.

- Ontario's recovery targets are calculated based on the amount of packaging recovered for recycling or reuse. Producers are required to report the weight of packaging recovered and their end markets. Therefore, while producers are obligated to report the fate of covered packaging, including whether it is reused, recycled, used for landfill cover, incinerated, or landfilled, the regulation does not prescribe a specific method for end-of-life management.

- Quebec has set both recovery and reclamation targets. Recovery targets are calculated by dividing the weight of material recovered by the total weight of packaging covered by EPR sold into the province. Reclamation targets consider the end market and measure the amount of packaging that is reused, recycled, used to manufacture new products, or sent to energy recovery, subject to a life cycle assessment. Both recovery and reclamation targets are calculated based on sampling from material recovery facilities (MRFs) before and after sorting, sampling from processors, and waste characterizations from sorting and processing centers. The modeling uses Quebec's recovery rates, as these are calculated based on sampling from sorting centers, which aligns with the methodology used for Washington's current recycling rates.

- France has set recycling targets that are measured based on post-sorting data. This method concentrates on the percentage of waste materials that successfully make it through the sorting process and into recycled commodities. However, this method does not capture contamination in sorted bales or losses incurred at various stages of the recycling process.

- The EU's calculation method relies on the quantity of packaging that enters a recycling process after undergoing sorting to remove contaminants and non-target material. However, there is a provision that allows the calculation to be based on the amount of material that is exiting a sorting facility, excluding any additional contaminants that may be removed prior to recycling from the calculation. The EU's methodology also details the way Member States must report achievement of recycling targets, including effective quality control and traceability systems to ensure compliance. Packaging waste exported from the EU can be counted as recycled by the Member State where it was collected, provided it complies with EU waste shipment regulations and recycling standards. In striving to achieve recycling targets, Member States have the option to adjust recycling targets by considering packaging placed on the market as part of a reuse system. Section 2.2.2.2 on reuse targets discusses this further.

- California is in the process of establishing its recycling rate calculation methodology through rulemaking and is suggesting a modification to the methodology originally specified in legislation. The original method includes only recycling and disposal in the denominator, while the proposed CalRecycle definition focuses on the recycling rate in relation to the total material generated. The formula proposed by CalRecycle likely aims to include material that is neither disposed nor recycled, meaning that it may leak into the environment (through littering or illegal disposal) or may be exported. Furthermore, assessing recycling rates based on total generation may be more straightforward, as producers must report the quantity of covered products distributed or sold. This reporting requirement will streamline the calculation of recycling rates, aiding in the monitoring of target achievements.

- Oregon's recycling rate is only for plastics. It is calculated by dividing the amount of recycled plastic packaging by the amount generated.[3] The rate will be calculated based on the post-sorting output and the destination of materials at end markets. Oregon's law setting recycling targets requires producers and processors to ensure that collected material reaches responsible end markets. A responsible end market is

defined as a "material market in which the recycling or recovery of materials or the disposal of contaminants is conducted in a way that benefits the environment and minimizes risks to public health and worker health and safety".[4] During a recent rulemaking meeting, the Oregon Department of Environmental Quality presented rule concepts to clarify this definition, including specifying the criteria and standards that make an end market responsible and establishing protocols and requirements for implementation, reporting, auditing, and enforcement. Producers must report the location of processing facilities, the end markets of packaging, and the final disposition by weight or volume.

Adopting calculation methodologies that capture only material being recycled, excluding recovered non-target material and contaminants, is important to give an accurate picture of the amount of packaging that is recycled and ensure compliance with targets. Section 2.3.1 outlines how recycling rates were calculated for the modeling in this study.

Table 4: Recycling Rate Calculation Methods in Select Jurisdictions

Jurisdiction	Material	Recycling Rate Calculation
California	Plastic	$\text{Recycling Rate Set in Legislation} = \frac{\text{Plastic Packaging Recycled}}{\text{Plastic Packaging Recycled + Disposed}}$ $\text{Recycling Rate Proposed by CalRecycle} = \frac{\text{Plastic Packaging Recycled}}{\text{Plastic Packaging Generated}}$
Oregon	Plastic	$\text{Recycling Rate} = \frac{\text{Plastic Packaging and Food Serviceware Recycled}}{\text{Plastic Packaging and Food Serviceware Generated}}$
British Columbia	All	$\text{Recycling Rate} = \frac{\text{Packaging Collected}}{\text{Total Amount of Packaging Sold}}$
Ontario	All	$\text{Recovery Rate} = \frac{\text{Packaging Recovered for Recycling or Reuse}}{\text{Total Packaging Sold}}$
Quebec	All	$\text{Recovery Rate} = \frac{\text{Weight of Material Recovered}}{\text{Total Weight of Packaging Covered}}$
EU	All	$\text{Recycling Rate} = \frac{\text{Amount of Packaging Waste Entering Recycling Facility} *}{\text{Total Amount of Packaging Waste}}$ *Data used for the calculation must be clean target material and cannot include any contamination
France	All	$\text{Recycling Rate} = \frac{\text{Weight of Material Entering the Recycling Process}}{\text{Total Amount of Packaging Placed on Market}}$

Justification for Recycling Targets

Targets typically emerge from a combination of technical assessments and political negotiations, striking a balance between what is technically achievable and politically acceptable. As a result, in most jurisdictions, justifications for

targets are rarely publicly available. In the EU, the process requires a published impact assessment, providing insight into target justifications.

The establishment of targets in the EU generally involves measuring the current performance to set a baseline, conducting cost-benefit and environmental analyses, establishing overall socio-economic goals, creating different policy scenarios to model targets and assess impacts, and conducting negotiation among different stakeholders. In 2014, the European Commission contracted Eunomia to lead a study assessing updates to the recycling targets in the EU Packaging Waste Regulation, which includes EPR as a policy requirement for Member States.[5] The study measured the performance of Member States against the previous set of recycling targets. Many Member States had exceeded the previous targets for paper, metals, and plastic, providing a strong rationale for establishing more ambitious ones. For example, the previous recycling target for plastic was 22.5%, which most countries had exceeded.[6] To ensure the collection and recycling of plastic packaging, especially beyond easily recyclable items like plastic bottles, more ambitious targets are essential. The study recommendations included setting challenging objectives to incentivize investments in plastic sorting and recycling infrastructure. The initial proposal of 45% by 2020 and 60% by 2025 was adjusted to 50% by 2025 and 55% by 2030; the justification for the five-year delay is not known.

2.2.2.2 Reuse Targets

The table below provides an overview of findings regarding reuse targets in other jurisdictions. Eunomia reviewed the legislation in each jurisdiction to understand the range of covered products associated with reuse targets. Links to the legislation and additional detail on reuse targets in each jurisdiction are included in the Appendix in Table 47.

Table 5: Reuse Targets in Select Jurisdictions

Jurisdiction	Reuse Targets					
	Product-specific	Material-specific	Staggered timeline	Calculation methodology	Number of reuses defined	Justification
California	☒	☑	☑	TBD**	TBD**	☒
EU*	☑	☒	☑	TBD***	TBD***	☒
Austria	☑	☒	☑	TBD***	☒	☒
France	☑	☒	☑	TBD***	☒	☒
Germany	☑	☒	☑	TBD***	☒	☒
Portugal	☑	☒	☒	TBD***	☒	☒
Romania	☑	☒	☑	TBD***	☒	☒
Chile	☑	☒	☑	☒	☒	☒

* The EU Packaging and Packaging Waste Directive is a draft. A final version will be released by the end of 2023.
** The rulemaking process in California will determine calculation methodologies and the number of rotations needed for a product to be considered reusable.

*** The EU will release the detailed calculation rules and methodology for reuse the targets by December 2028, which will apply to all European Member States.

Most packaging reuse targets are material agnostic. This is considered best practice, as no material for reusable containers and packaging has been conclusively established as the optimal choice in terms of performance and environmental benefits within a reuse system.[7] However, many environmental organizations have advocated for inert materials, such as glass and stainless steel, due to concerns about the migration of toxic chemicals into food or personal care products.

The EU has the most comprehensive reuse targets, which cover consumer and transport packaging; they will ramp up between 2030 and 2040 and apply to all EU Member States. Germany and Austria have additional reuse targets for beverage containers covered by a bottle deposit system. France, Portugal, Romania, Ireland, and Sweden have established national reuse targets for all packaging, set for 2030.

Outside Europe, only two jurisdictions have implemented legislated reuse targets: Chile and California. Chile instituted reuse targets for beverage containers and mandates that all on-site dining use reusable food service ware by 2024. California set reuse targets for plastic packaging in its EPR law, with deadlines in 2030 and 2032. Notably, California has material-specific reuse targets. In contrast, most other jurisdictions have either established comprehensive reuse targets covering all types of packaging or set targets for packaging categories, such as beverage containers, food packaging, and transport packaging.

Reuse Calculation Methodologies

Almost all jurisdictions studied have established reuse targets within the last five years but still lack detailed measurement calculation methodologies.

The EU will establish detailed calculation rules and methodology for reuse targets by December 2028, and these will apply in all European Member States.[8] Until the methodology is published, the law outlines the methods for producers to demonstrate their compliance with the targets, providing some insight into the way reuse is measured:

- Manufacturers of consumer packaging subject to reuse targets must calculate the number of packaging units available on the market within a Member State and the number of units for reusable and refillable packaging for each calendar year.

- Manufacturers of transport and storage packaging subject to reuse targets must calculate the number of units of reusable packaging used within a system for reuse each year, and the number of units of non-reusable packaging used in the same year, excluding reusable packaging.

In addition to reuse targets, the EU allows Member States to adjust the recycling targets by counting reusable packaging placed on the market for the first time. Member States can take into account up to five percentage points of the average share, observed over the preceding three years, of reusable packaging introduced to the market for the first time.

California's EPR law sets progressively increasing targets for reuse for plastic packaging. While the law lacks a specific methodology for calculation, it stipulates that the targets will be based on the number of plastic components and the weight of plastic materials converted to refillable or reusable packaging. California is in the process of rulemaking, with CalRecycle seeking feedback on proposed regulatory concepts to enable the implementation of the state's EPR program.[9] CalRecycle has proposed the following:

- Expanding the proposed definition of "durable" to emphasize the continued usability of packaging or food service ware for its original intended purpose and for multiple uses.

- Introducing a definition for “multiple-uses” to clarify the requirement that reusable or refillable items must be used enough times to yield environmental benefits surpassing those of single-use packaging.

- Expanding the definition of reusable/refillable to include "return to the marketplace" for resale or distribution.

- Extending the definition of "washable" to include packaging, outlining criteria for packaging to be considered washable for safe and hygienic reuse or refill, and specifying that food service ware and food packaging must endure a defined number of cleaning and sanitizing cycles.

Chile’s mandate does not yet have a corresponding measurement methodology.

The development of measurement calculation methods has two prerequisites: 1) defining reuse and refill more precisely, and 2) clarifying the minimum number of rotations and durability requirements for packaging to be considered reusable.

Justification for Reuse Targets

The justification for reuse targets is rarely made public or explicit. Targets often result from multiple rounds of negotiation and represent a compromise between political actors, industry stakeholders, technical experts, and environmental organizations. However, an analysis of reports assessing legislation or soliciting feedback on proposed standards can shed light on the process of target formulation and give insight into the rationale behind targets.

In the case of the EU’s reuse targets, which are among the most detailed to date, the development process involved assessing a long list of potentially reusable packaging types against the following criteria[10]:

- Does the reuse option meet functional requirements of health, hygiene, and safety?

- Does the reuse option decrease the generation of waste?

- How many reuse system models are available or in place for a given product (e.g., business-to-business, refill at home, refill on the go, etc.)?

- Is the reuse system easy to implement? Is it likely to be implemented and adopted based on costs, convenience for retailers and consumers, and durability of packaging?

Following this assessment, the resulting shortlist of products was discussed with stakeholders to determine which options would have the most proportionate impacts. An overall reuse target associated with these products was subsequently developed; this was based on existing performance data on reuse, existing and proposed legislation on reuse (focusing on quantitative data), and consideration of feasibility given technical and economic challenges. Additionally, the targets were developed with consideration for developing economies of scale for system operators. This resulted in the creation of two scenarios: a low-ambition scenario and a high-ambition scenario, each featuring a primary target for 2030 and a secondary target for 2040. Justifications for reuse, like recycling targets, can be traced back to both technical considerations and the political process.

2.2.2.3 Source Reduction Targets

Eunomia researched source reduction targets and identified examples associated with packaging and single-use plastic. The review also included legislated bans, with bans on products and packaging quantified as 100% source reduction targets in Table 6. The modeling scenarios incorporated Washington's existing ban on expanded polystyrene packaging.

The source reduction targets identified for most jurisdictions are associated with specific types of packaging, such as beverage bottles, food containers, or single-use packaging. Bans targeted specific products, items, and packaging. The European Union is the only jurisdiction with a source reduction target that covers all packaging. California is the only jurisdiction with a policy for source reduction achieved solely by eliminating plastic components. Table 6 provides an overview of the main research findings; detail on source reduction targets in each jurisdiction is included in the Appendix in Table 48.

Table 6: Source Reduction Targets in Select Jurisdictions

Jurisdiction	Source Reduction Targets				
	Product-specific	Material-specific	Staggered timeline	Calculation Methodology	Justification
California	☒	☑	☑	TBD**	☒
Canada	☑	☑	☑	☑	☒
European Union (Draft Packaging Waste Directive)*	☑	☒	☑	TBD**	☒
European Union (SUP Directive)	☑	☑	☑	☑	☒
France	☑	☑	☑	☑	☒
Greece	☑	☑	☑	☑	☒

* The EU Packaging and Packaging Waste Directive is a draft. A final version will be released by the end of 2023.

** Calculation methodology to be released in the final version of the Packaging Waste Directive in the EU and established through rulemaking in California.

Source Reduction Calculation Methodologies

The European Union has established source reduction targets for each Member State, mandating a reduction in per capita packaging waste generation from the 2018 baseline. This allows Member States to retain flexibility in how they achieve this objective by adopting a mix of reuse and reducing unit weight methods that align with the market dynamics specific to each country.[11] Source reduction can be met through weight reduction and lightweighting, bans, or adoption of reuse and refill systems. For example, Spain's waste prevention program aims to achieve source reduction targets through encouraging reuse systems, developing educational and awareness campaigns for consumers that promote waste prevention and reuse, and introducing public procurement requirements promoting the reduction of packaging consumption and the adoption of reusable or refillable packaging options.[12] However,

there are no assessments of progress made on source reduction by Member States nor comprehensive methodologies aimed at attaining the EU targets.

California's SB 54 sets a source reduction target for plastic components only. CalRecycle has requested feedback on the establishment of a baseline for source reduction targets in terms of the weight and number of plastic components in plastic materials sold or distributed in the state.[13] The proposed baseline year is 2023, and it will encompass two critical measurements: the total weight of plastic materials and the overall count of plastic components in these materials. Potential solutions to gathering baseline data include estimating plastic tonnage using production and sales data or contracting a study to collect data from producers on the amount of material sold or distributed.[14] This highlights the difficulties in modeling source reduction targets. These challenges primarily stem from evolving statutory requirements and the necessity to preemptively identify and secure the required data to ensure the successful implementation of targets.

Justification for Source Reduction Targets

Eunomia did not find published justifications for source reduction targets. In general, source reduction targets are the least well-described and data-driven of all targets researched.

2.3 Calculation of 2021 Baseline Recycling and Reuse Rates

To understand the impact of modeled scenarios, Eunomia first determined current recycling performance in Washington. The project team began this task by developing baseline estimates for 2021 recycling rates, reuse rates, and single-use plastic waste generation. This section details the methodology employed, including data sources and assumptions.

2.3.1 Recycling Baseline

This analysis builds upon the *Consumer Packaging and Paper Products* (CPPP) study that Eunomia conducted for Ecology in 2022, which estimated recycling rates for consumer packaging and paper products in Washington in 2021.[15] It incorporates updated data from Ecology's recently published *Waste Generation and Recovery Data*.[16] The CPPP report used data provided by Ecology on Washington's annual recycling activity to determine the total amount of recycled materials and recycling rates for 2021.[17] These data include annual reports from facility operators on the handling of recyclable material.

To assess how different policies might affect recycling, Eunomia broke down these values to the individual household level, enabling the tracing of how materials move through the waste system under each of the proposed policy scenarios.

This was conducted by doing the following:

- Estimating the number of households with access to waste collections at curbside and recycling drop-off depots in Washington. This is important to distinguish the impact of improving curbside coverage under future scenarios.

- Estimating the number of households that elect to use curbside services where not mandated. This informs the actual tonnage of material that will flow through the curbside collection system.

- Estimating the average weight of each material captured by curbside and depot collections. This informs the impact of improving collection efficiencies under future scenarios.

- Estimating the average weight of each material that is lost during the sorting process. This provides an understanding of the impacts of improving sorting efficiencies under the policy scenarios.

Recycling rates were calculated using the estimated quantity of material that leaves a sorting facility. The recycling rate calculation is:

$$\text{Recycling Rate} = \frac{\text{Material leaving a sorting facility (tons)}}{\text{Material generated (disposed + recycled tons)}}$$

The sections below detail how each step was conducted.

Curbside and depot coverage

Eunomia developed different sets of assumptions on the pathway (curbside or depots) by which material would flow through the recycling management system in Washington. The first step was to understand approximately how much of Washington would be serviced at the curbside versus at depot sites. A household has curbside coverage if recycling is collected from their property; this applies to both single-family and multi-family residences.

The 2021 curbside coverage rates draw upon the 2022 *Ecology Municipal Waste Management Access Report*.[18] This dataset contains information on the number of single-family and multi-family households in each service area and the type of waste collection service to which they have access, including single-stream, dual-stream, and frequency of collection. Dividing the total number of households estimated to receive curbside collection service by the total number of households in Washington resulted in an overall curbside coverage estimate of 83 percent. This is in line with the estimated curbside coverage reported in Northwest Product Stewardship Council's 2021 report.[19] The modeling then assumed that the remaining 17% of households rely on recycling their waste through dropping it off at depot collection services.

Next it was important to understand which materials curbside collection services currently accept for recycling.

Material Acceptance

Currently, Washington does not have a uniform, statewide list of materials accepted for recycling. This means that each municipality or county designates which materials collection services will accept. These decentralized lists of accepted materials can often exacerbate confusion about recycling and lead to inconsistent quality in the materials received (i.e., increased contamination in the recycling stream and recyclable materials ending up in garbage). Consequently, the project team estimated material acceptance at curbside and depot sites to understand which consumer packaging materials are currently being accepted by collection services.

The material acceptance at curbside is the percentage of households covered by curbside collection that accept collection of each packaging waste material type (e.g., glass).

$$\text{Material Acceptance at Curbside (\%)} = \frac{\text{Households where collection service accepts the packaging material}}{\text{Total households covered by curbside services}}$$

These rates were estimated based on the 2022 *Ecology Municipal Waste Management Access Report*, which recorded whether certain materials are accepted for collection in each service area.[20] Households in each service

area where the packaging material is collected were summed and then divided by the total households covered by curbside services. The depot acceptance for each material was estimated by conducting a similar analysis: the number of households in areas with depot services that accepted the material divided by the total number of households not serviced by curbside. See Appendix A.1.2.2 for further information on the material acceptance methodology and estimates.

Capture rates

The final step to understanding collection in Washington is to estimate capture rates. In previous steps, Eunomia estimated the allocation of households to curbside versus depot collection services and the correlating material acceptance. The capture rates inform how much of the material generated by households is captured by their collection system. For example, if the curbside capture rate for a material is 30 percent, then for the households that use curbside services, one can expect 30 percent collection of the generated material.

Eunomia used the descriptive statistics from the 2022 *Ecology Municipal Waste Management Access Report* and 2021 recycling and disposal data from Ecology's CPPP report to calculate 2021 capture rates for households with recycling services.[21, 22] The CPPP report published recycled tonnage as well as disposed MRF residue for each material in Washington, and collection tonnage was estimated by adding these together. To estimate the capture rates, the collection tonnage was divided by the total in-scope generated. For instance, an example of the calculation for cardboard is shown below where generation is calculated by combining recycled tonnage plus disposed tonnage of material.

$$\text{Curbside Capture Rate for Cardboard} = \frac{\text{Collected tonnage of Cardboard at Curbside}}{\text{Generated tonnage of Cardboard by Households Covered by Curbside Services}}$$

These capture rates serve as an indicator of the effectiveness of recycling programs at managing materials of interest. Additionally, capture rates aided in identifying areas of opportunity for increased capture of materials including rigid plastics, flexible plastics, glass containers, aluminum, steel, and paper. It is worth noting that, currently, residential curbside programs in Washington do not accept flexible plastics. Therefore, the 2021 capture rate is presumed to be zero, despite some of the flexibles ending up as material recovery facility (MRF) residue. See Appendix A.1.2.3 for further information on the capture rate methodology and estimates.

Sorting losses

After materials are collected, they typically go to material recovery facilities (MRFs) to be sorted. MRFs work to remove as much contamination as possible; they sort collected recyclables into designated material bales before sending the material to recycling processing facilities. The level of sorting required varies by the collection service. For instance, at depot sites most materials have separate bins (i.e., glass, paper, plastics etc.), which means minimal sorting, if any, is necessary to prepare them for processing into bales. However, curbside collection often gathers commingled waste, which means that all materials are collected in one receptacle. This requires a great deal of sorting to separate materials and remove contaminants, and as a result some additional material falls through the MRF's screens (i.e., residuals) or is missorted. These materials either do not make it to the correct bale for that material or end up in MRF residue; these are considered sorting losses.

Sorting loss represents the quantity of material that leaves the sorting facility compared to the quantity of material that arrives.[23] Using the collected tons estimated in the previous step, along with the CPPP reports' published recycled values (equivalent to sorted material), the sorting loss rate was calculated for each material at curbside and

depot (this calculation is listed below). See A1.2.4 for further information on the sorting efficiency methodology and estimates.

$$\text{Sorting loss rate (\%)} = \frac{\text{Collected tonnage} - \text{sorted tonnage}}{\text{Collected tonnage}}$$

Recycling Rates

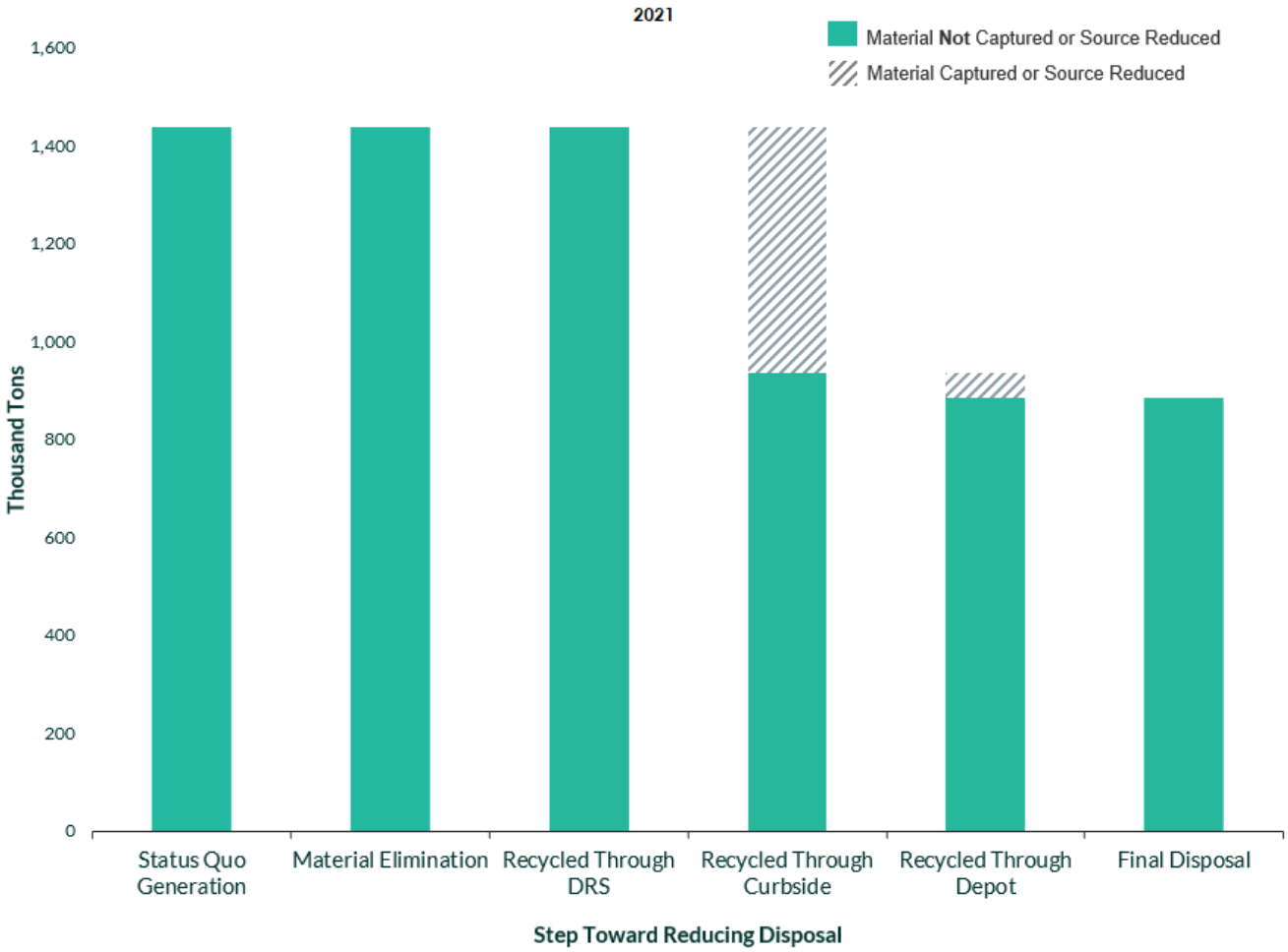
Starting with these foundational assumptions, Eunomia then calculated recycling rates for various recycling pathways, such as curbside versus depot, and for both single-family and multi-family residences.

First, curbside access estimates determine the number of single-family and multi-family households with access to curbside collection compared to depot services. This informs the amount of household-generated waste that these different services could potentially collect. Eunomia then applied material acceptance rates and capture rates to estimate the tonnage of materials captured through each of these pathways. Sorting loss rates were then applied to account for relevant sorting losses. The resulting recycled tonnage estimates were divided by the generated waste tonnage to calculate recycling rates.

Figure 4 shows Washington's 2021 recycling performance projected out to 2032 tonnages under current policy, using per capita income growth projected by the Washington State Economic and Revenue Forecast Council.[24] This figure is intended to visually convey how the current recycling system in Washington is targeting waste materials and the approximate impact of that system. Each bar delineates distinct stages at which generated material has the potential to be either effectively captured by the waste management system or undergo source reduction/material elimination. Status Quo Generation (the bar on the far left) illustrates the estimated tonnage of generated waste. Other bars incorporate hatched sections to signify the anticipated quantity of waste that can be successfully captured or subjected to source reduction at each respective stage.

Final Disposal (the bar on the far right) depicts the remaining amount of waste material destined for disposal, such as at landfills. This demonstrates that curbside is the predominant method of waste collection at present, with depot the only other mechanism for capturing material.

Figure 4: 2021 Washington Recycling Profile and Material Diverted through Each Pathway



As the graph shows, no material is currently recycled through a DRS in Washington. Additionally, Table 7 lists the estimated statewide residential recycling rates for the categories studied in this report that make up CPPP:

- rigid plastics (PET bottles and PET other packaging, HDPE natural and colored bottles and HDPE other packaging, PVC packaging, LDPE packaging, PP packaging, PS packaging, #7 other packaging, EPS, PLA/compostable packaging);
- flexible plastics (PE plastic bags and film, other plastic film, and flexible packaging);
- metal (steel cans, aluminum cans, other nonferrous metal);
- paper and paperboard (newspaper, cardboard, paper packaging, mixed paper, cartons); and
- container glass.

Note that the report discusses non-can aluminum materials as well. This is a material category that includes packaging such as foil and pet food, which fall under the broader 'other nonferrous metal' category.

Table 7: Washington Residential 2021 Packaging Recycling Rates

Category	2021 Recycling Rate
Rigid Plastics	15%
Flexible Plastics	1%
Metals	41%
Paper and Cardboard	51%
Container Glass	31%
Total CPPP	40%

2.3.2 Reuse Baseline

The only data on reuse rates for Washington State are from a 2021 report by Ecology, which states that one ton of glass was currently under reuse.[25] Therefore, the current amount of reuse in the residential sector in Washington is considered zero.

2.4 Scenario Selection

Eunomia consulted with Ecology to develop four policy scenarios to model the impact of recycling, reuse, and source reduction and materials management in 2032. The goal was to identify and assess realistic policy interventions that could have significant impact on recycling, promote reuse, and reduce single-use plastics (SUP) generation in the state. This generated an emphasis on the following policy interventions:

Extended Producer Responsibility (EPR): Included based on support for EPR as a policy action in Washington in previous studies, including the 2020 Plastic Packaging Study commissioned by the legislature.[26] Additionally, the Washington Recycling and Packaging Act (HB 1131), also known as the WRAP Act, would have established EPR for packaging and paper products.

Deposit Return System (DRS): Included based on support for DRS as a policy action in Washington in previous studies, including the 2020 Plastic Packaging Study commissioned by the legislature.[27] Additionally, the WRAP Act would have established DRS for beverage containers. It is important to note that the WRAP Act, as written, did not include beverage cartons in the proposed DRS. However, as this study models a best-in-class DRS, beverage cartons are included as an accepted material.

Post-Consumer Recycled Content (PCR): Included because Washington has already taken policy action to improve recycling of plastics through recycled content requirements (RCW 70A.245), and expanding recycled content requirements for plastic packaging was a top recommendation from the 2020 Plastic Packaging Study.[28] Additionally, the WRAP Act would have expanded the scope of products required to meet PCR content minima from those in Chapter 70A.245 RCW. Scenarios 2 and 3 are modeled based on the current PCR content requirements, while Scenarios 1 and 4 are modeled based on the expanded PCR list proposed during Washington's most recent legislative session.

Reuse: Included because the WRAP Act required a rates study to establish reuse targets for 2032 and would have set reuse targets for beverage containers covered under DRS.

Market-Driven Material Acceptance: Included to reflect policy interventions that the state of Washington could adopt as informed by market forces. A coordinated list of material collected at the curbside is informed by the materials currently widely collected through curbside programs in Washington, as suggested by the Washington Association of Counties Solid Waste Managers (WACSWM) Recycling Guidance.[29] The list draws from WACSWM's recommendations as well as the Federal Trace Commission's curbside access threshold to claim recyclability, which it states is 60%.[30] This list would be implemented by a governing body, potentially by the state or a collective of counties (e.g., WACSWM). Materials not widely collected through curbside services would instead be collected exclusively at depot sites. No households without curbside service in 2021 receive curbside services under this scenario (i.e., the number of households with curbside services stay the same). Policies (including PCR, a uniform statewide list, and truth-in-labeling) could be enacted to support materials that are currently marketable.

Eunomia conducted further research to gather necessary data for the required assumptions, including for capture rates and sorting efficiencies, to create a robust foundation for scenario development, as shown in Table 8.

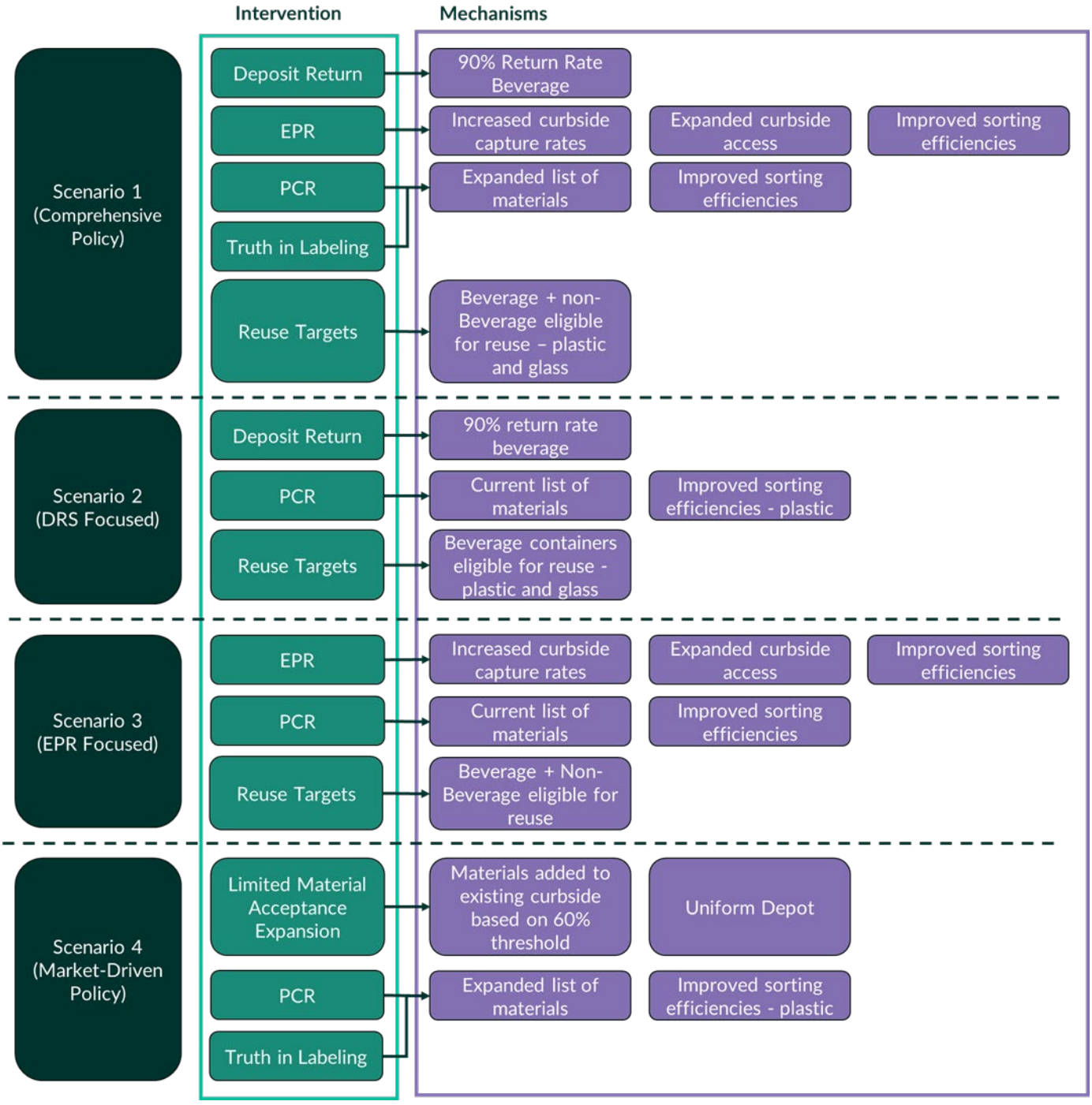
Table 8: Summary of Interventions and Scenarios

Intervention	Scenario 1 (Comprehensive Policy)	Scenario 2 (DRS Focused)	Scenario 3 (EPR Focused)	Scenario 4 (Market-Driven Policy)
Recycling-Focused				
Extended Producer Responsibility (EPR)	Yes	No	Yes	No
Deposit Return System (DRS)	Yes	Yes	No	No
Post-consumer Recycling (PCR) Rate Targets	Yes – Expanded	Yes - Current	Yes - Current	Yes – Expanded
Market-Driven Material Acceptance	No	No	No	Yes
Reuse-Focused				
Reuse Targets	All product types eligible	Beverage containers eligible	All product types eligible	None

2.5 Overview of Scenario Modeling Process

Figure 5 provides an overview of each scenario structure, including its policy interventions and the modeling mechanisms associated with each intervention. Modeling mechanisms serve as input features in the model, emulating anticipated changes resulting from the interventions. The following sections detail how these modeling mechanisms were selected, what data sources were used, and the assumptions made.

Figure 5: Scenario Policy Intervention and Mechanism Mapping



2.5.1 Recycling

As illustrated in Figure 5, the policy interventions resulted in the following for the recycling system:

EPR: The WRAP act would have introduced a uniform list of materials to be collected and processed by the system, in addition to mandating convenient recycling services statewide. Furthermore, it was assumed that the investments made by the PRO would result in improvements to system-wide effectiveness. Consequently, EPR was modeled by providing universal curbside collection, designating a uniform materials list, projecting increased capture rates, and improving sorting efficiencies.

DRS: Implementation of a DRS would introduce separate collection and an incentive for consumers to return beverage containers. Consequently, this intervention was primarily modeled by an increase in return rates for beverage containers made from the covered materials: container glass, aluminum used beverage containers (UBCs), PET and some HDPE beverage containers, and beverage cartons.

Market-Driven Material Acceptance: Included to reflect three policy interventions that the state of Washington could adopt as informed by market forces. A uniform statewide list could ensure that material collected at the curbside includes those materials that are currently widely collected through curbside programs in Washington. The list draws from the WACSWM Recycling Guidance as well as the Federal Trade Commission's curbside access threshold to claim recyclability, which it states is 60%.[31] This list could be implemented through changes to state regulations that direct counties and some cities to establish recyclable material acceptance lists and collection methods as part of solid waste management plans and through solid waste ordinances, as applicable. Materials not widely collected through curbside services, but which are currently considered marketable, could instead be collected exclusively at depot sites. No households without curbside service in 2021 receive curbside services under this scenario (i.e., the number of households with curbside services stay the same). Additional policies, including PCR and truth-in-labeling requirements, could be enacted to further support recycling of materials that are currently widely accepted and marketable.

The PCR requirement for packaging items includes an extended version of the current PCR law. The PCR list for Scenario 4 includes:

- Plastic beverage containers
- Plastic household cleaner products
- Plastic wine containers
- Flowerpots
- Single-use Plastic Cups

Truth-in-labeling requirements establish rules for labelling the recyclability of a product, resulting in better education of how to accurately recycle on the consumer end.

Comprehensive policy: All improvements from the above interventions were combined into one scenario, with the material acceptance changes under the market-driven scenario being superseded by the broader policies of EPR and DRS.

The following sections detail decisions and assumptions made for each of these changes under the scenarios. Calculated tonnage numbers in this report are rounded and therefore may not sum to the exact totals.

Curbside Coverage

For this model, EPR curbside coverage was expanded to model statewide access to recycling. Under Scenarios 1 and 3, the following curbside coverage assumptions were made:

- **Universal curbside coverage:** It was assumed that curbside coverage would be universally available, as garbage collection currently is in the state, and would increase the coverage from 83% in 2021 to 100% for 2032.

- **Expanding access for non-curbside households**: Households that do not currently receive curbside coverage were assumed to receive dual-stream (commingled with a separate glass bin) collection every other week under EPR in 2032.

Scenarios 2 and 4 did not assume any changes to curbside coverage and were therefore modeled using 2021 curbside coverage rates.

Material Acceptance

Material acceptance at curbside was assumed to differ from 2021 estimates in two ways under the future scenarios:

- Uniform material acceptance under EPR across Washington (Scenario 1 and 3) (i.e., a coordinated list of materials across the state).

- According to a 60% threshold under the market-driven scenario (Scenario 4).

Under EPR, it was assumed that a universal material acceptance list, or a common set of materials, would be established. This list was determined based on the list used in the 2020 *Container Deposit Study* by King County Department of Natural Resources and Parks and was reviewed by Ecology.[32] It drew inspiration from the British Columbia uniform acceptance list of curbside-collected material, with additional expansion based on discussions with Ecology and stakeholder consultation.[33]

PE plastic bags and films were added to this list, as it was necessary to ensure flexible plastics could achieve higher recycling rates in line with targets in other jurisdictions. For the materials identified to be universally collected, the material acceptance at the curbside increases to 100%. This means that all households with curbside service can recycle these materials. Materials not included on this universal list were assumed to no longer be collected by curbside services in future scenarios, even if they are currently being accepted (Table 49 in Appendix A.1.2.2). While film is not generally collected at curbside in the US, multiple Canadian provinces accept this material in curbside programs, including Ontario, Quebec, and Alberta.[34,35] Additionally, Merlin Plastics in British Columbia receives MRF film for recycling from Canadian municipalities. Merlin has also begun taking some plastic film from depot programs in Seattle.[36]

Under the market-driven scenario, Eunomia introduced a coverage threshold for materials. Materials that surpassed 60% curbside material acceptance in 2021, based on Ecology's Municipal Waste Management Access Report, were designated to achieve 100% acceptance for households who already had curbside service by 2032.[37] This scenario did not assume an expansion of services to cover households without curbside currently. Conversely, materials that did not meet this threshold were not required to be covered under curbside collection services and were assumed to fall to 0% acceptance rate at the curbside.

Under EPR and market-driven scenarios, materials not collected at curbside (those with 0% curbside acceptance) were instead exclusively collected at depot sites for management. The uniformity of curbside material acceptance lists under these scenarios consequently led to the creation of uniform lists for depot material acceptance as well. See Table 50 in Appendix A.1.2.2 for the drop off material acceptance rates utilized in the scenarios.

Capture Rates

Under EPR scenarios, Eunomia assumed that curbside capture rates would increase in response to additional investment and service expansion. To determine the capture rate improvements for these scenarios, Eunomia drew on research conducted in other jurisdictions, as discussed in Section 2.2. Furthermore, Eunomia evaluated these targets against the current highest reported capture rates in the state.[38]

Current capture rates in Seattle (31% for plastic packaging and 26% for overall packaging) may be regarded as difficult to achieve statewide if one considers Washington's 2021 statewide recycling figures. This was a consideration when modeling future recycling rates, particularly when assessing the challenges associated with promoting recycling in rural areas compared to densely populated urban regions. Consequently, Seattle's capture rates served as a benchmark to assess the feasibility of achieving other global recycling targets for Washington by 2032. However, targets from other jurisdictions, some with considerable rural populations, are even more ambitious than Seattle's current capture rates in some cases.

For example, Quebec has set its plastic targets to start from 50%, while the European Union has set a plastic target of 55% (as detailed in Table 8). It is worth noting that Quebec's higher plastics target factors in the presence of an established DRS which supports higher recycling rates. Furthermore, British Columbia and France both have set overall targets of 75%, considerably higher than the suggested overall capture rate above, though British Columbia also has a DRS.

Based on these findings, Eunomia concluded that the single-family (SF) curbside capture rates statewide could improve to match the currently highest performing SF curbside capture rates in the state. To address concerns about the slower rate of improvement for multi-family (MF) curbside capture rates, Eunomia assumed that these would perform at 70% of SF curbside capture rates. This aligns with the observation that Ontario's diversion performance tends to decrease as the proportion of MF households increases.[39] The full list of capture rates assumed in future scenarios, by material, is in Appendix A.1.2.3.

Additionally, the single-family capture rates used for mono-material plastic film and non-can aluminum (e.g., foil, pet food) came from Ontario and Quebec, respectively. No Washington municipalities currently accept plastic film at curbside, and thus a target for this would need to be informed by a jurisdiction that both accepts plastic film in curbside programs and reports the recycling rate for that material. Quebec fits both criteria, as the province includes plastic films in its curbside programs and reports mono-material film capture rates.[40] As it stands, Washington would need to consider improvements to infrastructure before 2032 to facilitate the capture of mono-material plastic film at the curbside. Eunomia accounted for some of these improvements in the sorting efficiency assumptions below.

In the case of non-can aluminum (e.g., food trays, pet food), capture rates were taken from Ontario for modeling purposes, as the rates from existing Washington data resulted in total aluminum recycling rates that were well below targets in other jurisdictions.

The findings of the modeling are compared to the target rates in other jurisdictions in Section 2.7; they reveal that the modeled recycling rates are in similar ranges to recycling rate targets from other jurisdictions. Following adjustments to the assumed capture rates based on the analysis of targets in other jurisdictions, described above,

the figures used produced an output in line with recycling targets elsewhere. This appears to justify the capture rates as valid for setting targets for Washington.

Any materials not covered by curbside collection under each scenario were assumed to be directed to depot collection. Under the future scenarios, EPR programs and other market-driven policies are assumed to create depot access rates for designated materials of 100%. This includes all materials except for non-recyclable plastics, such as multi-material films. This assumption is in alignment with the assumptions made in King County's Container Deposit Study.[41]

Sorting Efficiencies

Under each of the future scenarios, Eunomia assumed improvements to curbside sorting efficiencies between 2021 and 2032. This was due to the following reasons:

- A uniform list would help reduce contamination in the incoming feedstock to MRFs.
- Additional funding and recycling targets were assumed to drive investments in MRFs under EPR (Scenarios 1 and 3).
- Increased demand in PCR was assumed to drive investment in MRF technology under all scenarios to decrease the loss rates of material at the sorting stage.

The improved sorting efficiencies were informed by "best-in-class" estimates from the following sources (see Appendix A.1.2.4):

- *WM details sorting facility upgrades and plastics capacity (*Resource Recycling, 2020)[42]
- *Material Recovery for the Future Pilot Report* 2020 (Resource Recycling Systems, 2020)[43]
- European Commission's *Best Environmental Management Practice for the Waste Management Sector* (European Commission, 2018)[44]

In Scenarios 1 and 3 with EPR, Eunomia assumed that all materials collected at curbside were associated with improved sorting efficiencies. Specifically, materials with 100% coverage via a uniform materials list under the EPR program saw increased sorting efficiency, resulting in a lower sorting loss rate. In Scenario 2 with DRS, sorting efficiencies were assumed to improve for materials that are on the current PCR list of materials covering PET rigid packaging, HDPE bottles, and PP rigid packaging.[45]

In Scenario 4 with market-driven legislation, the current PCR list expands to include polystyrene rigid packaging as well. This reflects improvements in the recycling of single-use cups, which are typically made of PS material and represent a notable volume of high-quality food-contact material. The materials on this expanded PCR list saw improvements to sorting efficiencies.

Materials not included in the PCR list saw no improvements to sorting efficiency under Scenarios 2 and 4. All materials on the curbside acceptance lists saw sorting improvements under Scenarios 1 and 3. In cases, it is assumed that these materials will continue to be sorted at the estimated 2021 efficiency. Additionally, depot sorting efficiencies were not assumed to improve under any of the future scenarios.

Deposit Return System (DRS)

A DRS is in place for beverage containers in Washington under Scenarios 1 and 2. Eunomia used the residential beverage container tonnage data from the 2021 CPPP study to determine the tonnage of single-use beverage containers consumed by the residential sector in Washington. This tonnage would then be eligible for collection under a DRS. This analysis included all ready-to-drink beverage containers (all carbonated beverages including beer, all non-carbonated beverages, wines, and spirits, excluding milk) in the following forms:

- Glass beverage containers
- Aluminum beverage containers
- PET beverage containers
- HDPE beverage containers
- Carton beverage containers

The table below shows the tonnage of beverage containers generated and their contribution, as a percentage, to each material category.

Table 9: Beverage Container Generation in Washington

Material	Beverage Containers Generated (tons)	Beverage Containers as a % of whole Packaging Material Category
#1 PET	34,300	80%
#2 HDPE Natural	8,140	35%
#2 HDPE Colored	1,370	10%
Aluminum	21,750	90%
Carton	3,950	43%
Container Glass	118,000	75%
Total	187,510	N/A

To establish the performance which a DRS could achieve, Eunomia reviewed the return rates of best-in-class systems in North America and worldwide. Table 10 provides a summary of higher performing systems, with the maximum return rate quoted for each material and jurisdiction from 2019 to 2022. For example, if the highest annual return rate between 2019 and 2022 for a given jurisdiction was in 2021, that 2021 return rate is listed. The maximum is shown, as several deposit programs saw decreases in return rates in 2020.

Table 10: Deposit Return System Redemption Rate Performance in North America[46,47]

Jurisdiction	Highest Annual Redemption Rate, 2019 to 2022		
	Glass	Metal	Plastic

Oregon	76.90%	89.60%	83.90%
Alberta	92.60%	89.10%	81.60%
British Columbia	91.60%	82.80%	74.60%
Finland	99.00%	98.00%	92.00%
Norway	N/A	93.30%	92.80%

Norway does not include glass in its DRS. As Table 10 shows, plastic, metal, and glass have each been redeemed at rates at or exceeding 90%. Eunomia therefore assumed a best-in-class return rate target of 90% for all single-use beverage containers. This is in line with performance exhibited in Oregon and Alberta's DRS systems prior to the COVID-19 pandemic.[48,49] This return rate was applied to the beverage container volumes calculated to estimate a tonnage of collected beverage containers under the DRS system.

2.5.2 Reuse

Reuse systems extend a product packaging's lifetime, keeping it in use repeatedly and avoiding the emissions, waste, and costs associated with extracting new virgin materials, manufacturing new products or packaging, or processing required to recycle materials. The Ellen MacArthur Foundation establishes four reuse models in which (1) users refill their reusable container at home; (2) users refill their reusable container away from home; (3) packaging is collected from users' homes for reuse; and (4) users return packaging at a drop-off point ().[50]

Figure 6: Four Reuse Models

In this study, multiple products were modeled as switching a proportion of their sales into reuse across all four reuse models. Because an inestimable number of products could be eligible for reuse, the project team conducted modeling on a subset of products. This demonstrates the benefits of switching to reuse as well as how the relative quantities of different products influence the overall waste stream under reuse. The reuse modeling followed these steps:

1. Compiling a long list of reuse-eligible products and selecting a subset of nine to model based on specific criteria (explained in more detail below).
2. Calculating the baseline tonnage associated with each selected product in Washington.
3. Switching a proportion of each product to reuse, based on product-level targets from the European Commission (as they are the most detailed targets)
4. Calculating the avoided single-use tonnage as a result of reuse activities for the modeled products.

Product selection/expansion

Eunomia produced a matrix of eligible products which could be switched into reusable systems. The list was developed based on products included in the Bureau of Labor Statistics (BLS) Consumer Price Index (CPI), as this includes over 50 products commonly purchased by households.

The BLS also produces a "Relative Importance Index" for each of the products in the CPI.[51] This index shows how populations distribute their expenditure across all the products: the higher the expenditure on a product, the greater its relative importance. In the absence of data on tonnages of products sold, this CPI data indicates which products might have the greatest impact on the waste stream if switched to reuse.

While the project team explored other indices, the CPI data provided the most detailed product list of each of the datasets examined and thus was chosen as the starting point for product selection. Other indices reviewed include the BLS Classification of Individual Consumption According to Purpose (COICOP) index, Total Retail Trade from US Census Data, Personal Consumption Expenditures by State from the Bureau of Economic Analysis (BEA), and the Washington Retail Trade data published by the Washington Department of Revenue.[52,53]

To select the products to model, Eunomia identified key criteria against which to assess the feasibility and impact of switching each product to a reusable system. Table 11 summarizes the key criteria.

Table 11: Criteria for Evaluation of Product Eligibility for Reuse Modeling

	Criterion	Description
1	Relative importance in expenditure	Relates to how frequently households purchase a product.
2	Existence of reusable alternative	Whether a reusable alternative is already in existence for the product.
3	Feasibility of replacing with reusable alternative	The technical feasibility (easy, medium, hard) of establishing a system based on the reusable alternative for the product. This considers consumer usage, washing and cleaning, and return infrastructure.
4	Reuse program currently exists at scale in other jurisdictions	Whether a reusable system for this product exists in other jurisdictions, at scale.
5	Single-use material type	The material(s) associated with the single-use packaging of the product.
6	Baseline recycling rate of single-use material	The baseline recycling rate of the material; a lower recycling rate may indicate a greater need for reuse (e.g., plastic takeaway clamshells).
7	Reuse targets exist for product in European Commission draft legislation[54]	Whether the draft legislation for the European Commission includes a target for this product. European Commission targets were used as they have the most detailed and extensive product list for reuse among the jurisdictions researched.
8	Product sensitivity to reusable system	The sensitivity of the product to the logistics of a reusable system, including transportation, hygiene, and temperature control.

Each product was assessed against the variables listed above. Appendix A.1.3.1 shows the full analysis for each product. Products that are better designed for incorporation in a reuse system, as well as those with established targets, were preferred for inclusion in reuse modeling. After narrowing down the list of products based on this criterion, the following products were chosen to be modeled for reuse (Table 12).

Table 12: Products Selected for Reuse

Product	Description and Examples	Reusable Packaging Material
Glass beer	Glass beer containers	Glass
Glass wine	Glass wine bottles	Glass
HDPE and carton milk	HDPE and carton milk containers	Glass
PET non-alcoholic carbonated beverages	Soft drinks, sparkling water	PET bottle
PET non-carbonated beverages	Water, juice	PET bottle
Plastic and fiber takeaway food packaging	Plastic and fiber takeaway boxes and plastic packaging, poly-coated cups	Polypropylene container
Old corrugated cardboard (OCC) e-commerce boxes	Mail order parcels made of OCC	Polypropylene foldable box
Cereal	Chipboard cereal boxes	Polypropylene refillable box
Dry pasta	Dried pasta purchased in boxed packaging	Polypropylene refillable box

Calculating Single-Use Tonnage Generation of Select Product Categories

After selecting the products, Eunomia calculated the estimated tonnage of packaging material associated with each of the product categories at the 2021 baseline. Table 13 includes a description of the methodology used each product. Appendix A.1.3.2 provides more detailed calculations.

Table 13: Method of Tonnage Calculation for Chosen Products

Product	Method
Beverage containers	Beverage packaging tonnages were taken from the 2021 CPPP study published by Ecology. These were combined with Beverage Market Data Analysis (BMDA) from 2018.[55] The BMDA data provides the split of beverage containers sold by beverage type.
Take-Away food containers	Per employee tonnage of takeaway packaging was estimated using California's Business Group Waste Stream Calculator data based on a 2006 waste composition study for fast food restaurants.[56] This tonnage was then multiplied by the proportion of generated packaging waste, from the same study. This data was then multiplied by the number of employees working in limited services restaurants in Washington using Census data.[57] Finally, the waste generated was multiplied by the proportion of meals eaten off-premise. Fifty percent of this was assumed to be residential versus commercial takeaway meals. This may be a low estimate, but there is limited data on the destination of take-away food. This was taken from a European study from 2023 produced by Kearney.[58]

Product	Method
OCC e-commerce boxes	Tonnage estimated using national parcels per person estimates from the Pitney Bowes Parcel Shipping Index and a composition of parcel material type from a 2019 Packworld survey of 185 e-commerce brands.[59,60] The parcel number was multiplied by an average OCC parcel weight of 0.7 pounds from a 2022 Zero Waste Europe study on reusable packaging, and this figure was multiplied by the OCC split of residential versus commercial generation from the 2021 Washington CPPP study.[61]
Fiber material cereal boxes	Tonnage estimated using the number of boxes consumed nationally, based on Kiplinger data[62], and scaling this figure to the Washington population for 2021.[63]

Table 14 shows the tonnage of each product estimated at baseline, along with the implied percentage of MSW generated for that product type. Of the materials listed below, residential take-away foods account for the greatest tonnage of material, at 9% of all CPPP generated as calculated from the 2021 Ecology CPPP study.

Table 14: Single-Use Generation of Selected Products

Product	Tonnage Generated by Residential Sector	Product Generation as a % of overall Residential Consumer Packaging and Paper Products
Glass Beer	47,000	4%
Wine & Spirits	50,000	4%
Milk	8,400	1%
PET Carbonated Beverages	6,500	<1%
PET Non-Carbonated Beverages	24,000	2%
Takeaway Foods (PS, PET, Fiber)	112,000	9%
OCC E-commerce Boxes	45,000	4%
Cereal	6,300	<1%
Dry Pasta	1,000	<1%

Percentage of product uses switching to reuse

Eunomia applied reuse targets from other jurisdictions to the selected products to estimate total generation of the product. The targets modeled are simply those established in other jurisdictions. The reuse targets switched a proportion of the total uses needed of the product into reusable containers.

Table 15 shows the modeled reuse rates for each of the products. Reuse rates were taken from the product-by-product targets published by the European Commission. There is a lack of data on the current performance of Member States in the European Union in terms of reuse rates; however, as the Beer Store in Ontario achieves 20% reuse without any specific reuse targets, these rates appear appropriate as targets. The target setting could also unfold on a different timeline than the European Commission, as the Commission is still several years away from setting exact calculation rules for measuring reuse proportions.

The project team also discussed setting target numbers with existing reuse networks in Ontario (e.g., the Beer Store) and with reuse experts internally to gauge the level at which reuse would become economically viable for a system. The combination of discussions with existing reuse networks, targets established on a product-by-product basis, and discussions with internal reuse experts resulted in the modeled reuse rates shown in Table 15. Some of the modeled rates align with the European Commission targets, while some match the high or low ambition targets. These were decided during the discussions, and particularly with the internal project teams who conducted the feasibility study for the European Commission for both the low and high ambition targets.

Table 15: Modeled Reuse Rates for Washington with Comparison to European Commission (EC) Targets

Single-Use Product	Reusable Product Material	Estim. Annual Residential Tonnage Generated at Baseline in WA	Modeled Reuse Rate By % of Uses (2032) in WA	EC 2030 Reuse Target	Eunomia Draft Target Rate for EC– Low Ambition	Eunomia Draft Target Rate for EC– High Ambition
Glass Beer	Reusable glass	47,060	20%	10%	10%	20%
Glass Wine & Spirits	Reusable glass	55,220	10%	5%	5%	10%
HDPE and Carton Milk	Reusable glass	9,380	20%	Not specified	10%	20%
PET Bottle Carbonated Beverages	Reusable PET	6,300	20%	10%	10%	20%
PET Non-Carbonated Beverages	Reusable PET	24,200	20%	10%	10%	20%
PET Takeaway Foods	Reusable PP	1,200	10%	10%	10%	20%
PS Takeaway Foods (away from store)	Reusable PP	2,400	10%	10%	10%	20%
Fiber e-commerce Boxes	Reusable PP	45,000	10%	10%	10%	20%
Fiber Packaging Cereal	Reusable PP	6,200	10%	10%	5%	10%
Fiber Packaging Dry Pasta	Reusable PP	1000	10%	10%	5%	10%

Avoided single-use tonnage as a result of reuse

Eunomia modeled the mass flow of reusable containers from 2025 to 2032 to calculate the single-use tonnage avoided by switching to reuse in 2032. Because reusable containers can circulate for multiple years, Eunomia modeled a system in which reuse started before the target year of 2032.

Eunomia used input assumptions to model the number of reusable containers needed to be purchased each year, and the total number needed to be in circulation in a given year. These two key statistics rely on several assumptions that are detailed in Table 16, including:

- **The return rate of the product**: the proportion of sold containers in each reuse cycle that the consumer returns.
- **The days between uses of each product**: how long a reusable container remains with a consumer and the return system before it can be used again for sale.
- **The breakage rate of the containers in each cycle**: the proportion of returned reusable containers that are broken, discolored, or do not pass an odor test.
- **The maximum number of rotations a container can have in its lifetime**: the number of cycles a container can withstand in the reuse system before it is no longer viable as a packaging material, due to breakage, wear and tear, or other physical limitations.

These assumptions come from a variety of sources, including Eunomia reuse experts, interviews with organizations implementing reuse systems (e.g., The Beer Store in Ontario, Canada, the German bottled water reuse system), and a review of studies like Zero Waste Europe's *Economics of Reuse System* report.[64]

The total annual savings of material from switching to reuse are calculated using the following equation:

$$Tonnage\ of\ material\ avoided =$$

$$\text{single use generation at baseline} - ((\text{single use generation at baseling} * \text{percentage switch to reuse}) + tonnage\ of\ reusables\ wasted\ in\ a\ year)$$

Table 16 shows the assumptions for each product, along with the avoided tonnage of single-use packaging from the reuse system in 2032. Of the products chosen for reuse, beer and wine show the greatest tonnage avoided. Both these products are mainly packaged using glass and thus have a heavier weight per unit of packaging (or "use") than the other single-use products.

The products were assumed to have a return rate greater than 90% for each cycle. This level of return rate is necessary to achieve both economic and environmental benefits from the reuse system. Achieving a return rate for reuse above 90% may not be possible through purely voluntary programs. To have reuse rates in the mid to high 90th percentile, mechanisms such as deposits can be placed on reusable packaging to incentivize returns. Alberta offers a deposit for reusable glass containers and generally sees high return rates for this packaging – in 2022, reusable glass under deposit in Alberta achieved a 97.3% collection rate.[65]

Table 16: Reuse Modeling Overview Under Scenarios with All Reuse for 2032

Products	Beer	Milk	e-commerce boxes	Wine	Carbonated Beverage	Non-Carbonated Beverages	Cereal Boxes	Take-away Food Packaging	Take-away Food Packaging	Take-away Food Packaging
Material	Container glass	#2 HDPE natural bottles	Cardboard	Container glass	#1 PET bottles	#1 PET Bottles	#5 PP	#1 PET Other	#6 PS	Mixed Paper
Uses Switched to Reuse	20%	20%	10%	10%	20%	20%	10%	10%	10%	10%
Return Rate	95%	95%	95%	95%	95%	95%	100%	95%	95%	95%
Days between servings	60	60	60	60	60	60	30	60	60	60
Losses for breakage rate, discoloration, odor	1%	2%	1%	1%	2%	2%	1%	1%	1%	1%
Maximum Number of Rotations	25	50	12	50	20	20	100	50	50	50
Avoided Single-Use Tonnage	10,090	1,560	4,900	5,700	1,350	5,190	670	130	260	11,640
Reusable Tonnage Wasted	1,590	240	780	400	150	590	40	10	30	1,380
Total Tonnage Avoided	**8,500**	**1,320**	**4,120**	**5,300**	**1,120**	**4,610**	**640**	**120**	**230**	**10,270**
Tonnage Avoided (% of packaging category gen. under status quo)	**5%**	**12%**	**1%**	**3%**	**3%**	**9%**	**2%**	**1%**	**5%**	**3%**
Tonnage Avoided (% all packaging gen. under status quo)	**0.6%**	**0.1%**	**0.3%**	**0.4%**	**0.1%**	**0.3%**	**0.0%**	**0.0%**	**0.0%**	**0.7%**

Note: Totals may not add due to rounding.

2.5.3 Source Reduction

Source reduction targets achieved solely by eliminating plastic components are not provided as outputs of the modeling process in this study for several reasons:

- There is minimal data available about, and negligible justification for, source reduction targets set in other jurisdictions.
- Many source reduction targets in other jurisdictions, such as California's SB54, do not specify which packaging products must be source-reduced, only that the overall weight must be source-reduced. This makes it hard to develop an informed source reduction model.
- While jurisdictions like the European Union have established source reduction targets for each Member State, there have been no assessments of progress made toward source reduction targets, nor comprehensive methodologies aimed at attaining these targets. Consequently, there is no guidance or robust documentation about how to model or measure these targets.
- While there is interest in Washington in legislation to support source reduction by eliminating product components without replacement, there is a lack of clarity on how to model this for products broadly.

Given these challenges, the project found that it was ultimately not feasible to model source reduction targets achieved solely by eliminating plastic components. However, Eunomia did model a reduction of expanded polystyrene (EPS) packaging, which is captured as material elimination in all scenarios. This is in response to the existing law that bans EPS peanuts, food service products, plates, bowls, clamshells, trays, and cups. Eunomia estimated this reduction at approximately 50% of the EPS generated, based on the 2017 DSNY Waste Characterization. The ban takes effect between 2023-2024 in Washington, so the full effects will have occurred by 2032.

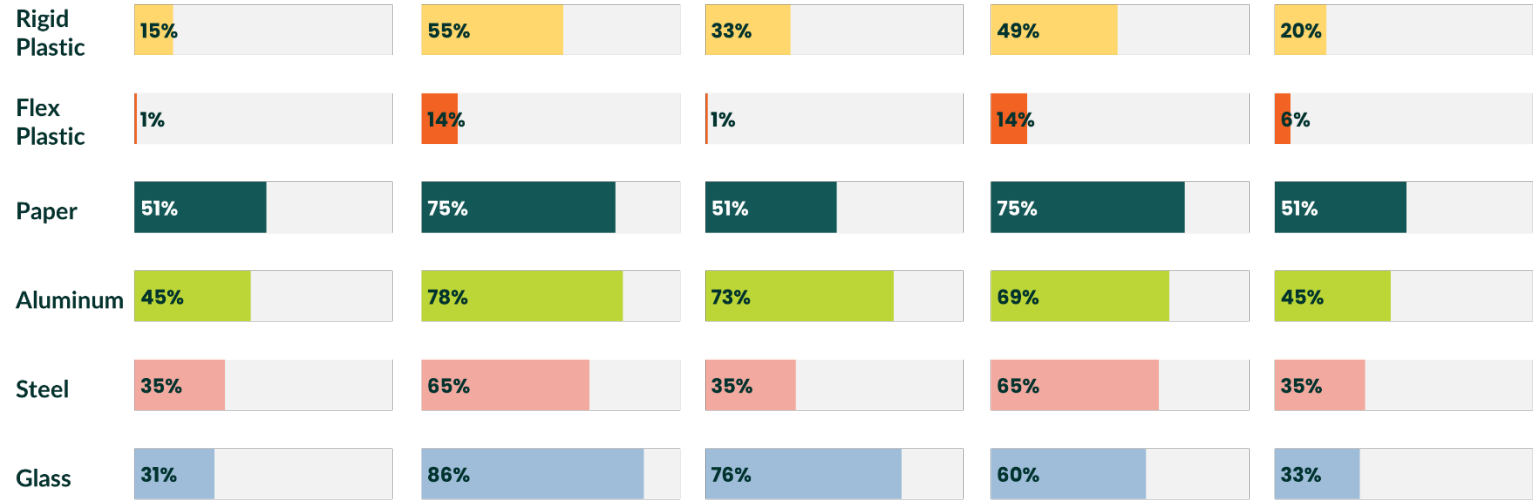
2.6 Findings: Highest Achievable Performance Rates

This section focuses on the results for each scenario and the underlying reasons for the differences in performance. Figure 7 shows recycling rates and avoided generation under each scenario, along with a comparison across scenarios; the following sections describe these in more detail. For a full description of the assumptions and more in-depth calculations, see Appendix A.1.0. In some scenarios, the benefits between the scenarios are not additive when policies are combined. As EPR and DRS capture some of the same material, the benefit of having both will not be the sum of both individually.

Figure 7: Overview of Scenarios Modeled

	BASELINE Washington status quo	SCENARIO 1 Comprehensive policy	SCENARIO 2 DRS focused	SCENARIO 3 EPR focused	SCENARIO 4 Market-driven policy
Tons Diverted	555,000	940,000	664,000	880,000	575,000
Recycling rate	40%	70%	50%	66%	41%

Recycling Rates by Material:

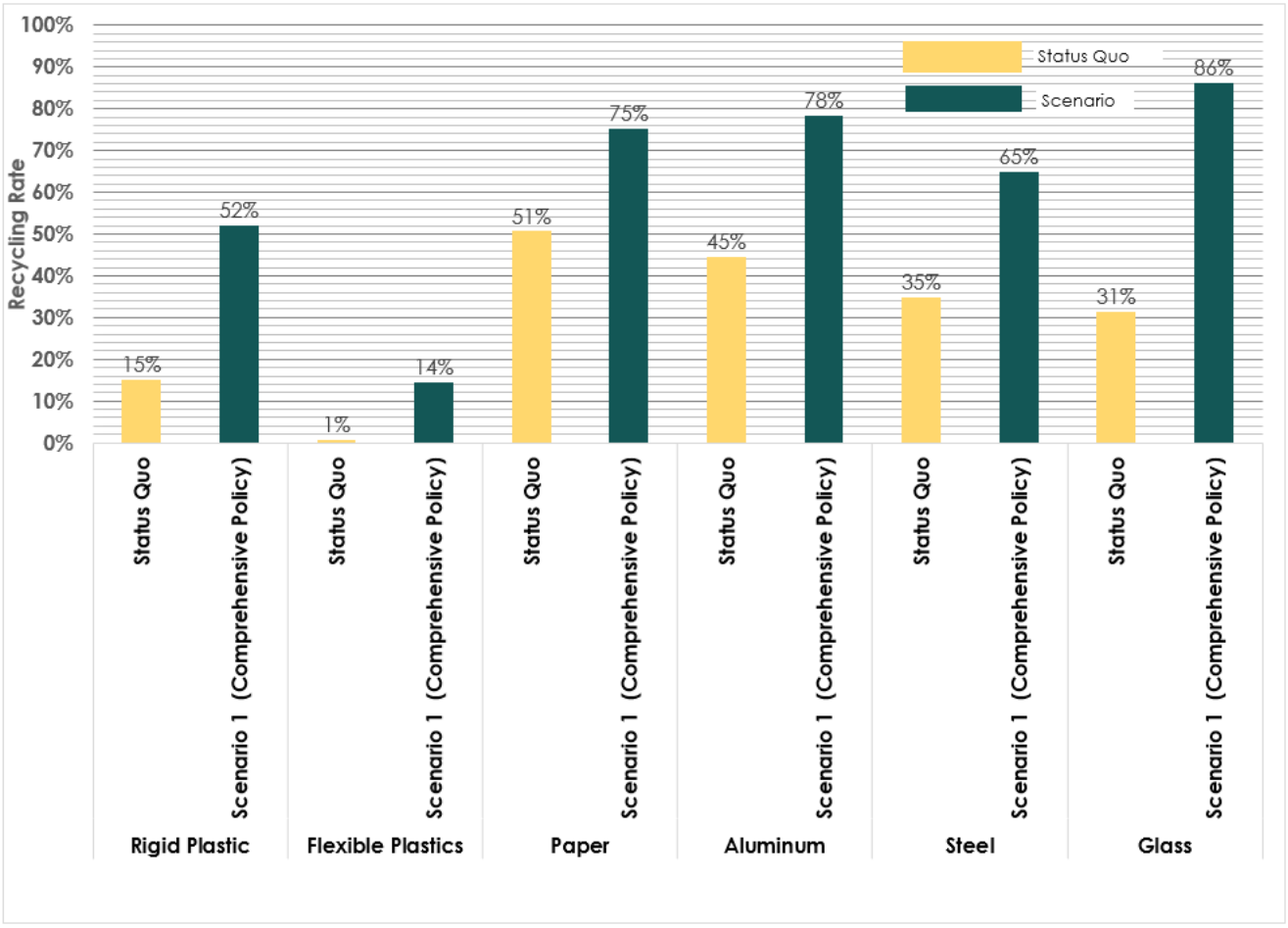


2.6.1 Scenario 1: Comprehensive Policy Scenario

Scenario 1 includes EPR, DRS, expanded PCR requirements, truth-in-labeling requirements, and reuse targets. It also includes PCR requirements and truth-in-labeling, but their impacts are outweighed by similar sorting efficiencies realized through EPR. It results in the greatest quantities of material source-reduced and recycled. Roughly 940,000 tons of material are captured or source-reduced compared to 555,000 tons under the status quo (an 80% difference). This scenario also results in the highest recycling rates of the four modeled scenarios. The total recycling rate under this scenario is 70%.

EPR increases curbside recycling collection access and raises capture rates for those curbside programs. EPR also provides drop-off service for certain hard to recycle materials. The DRS improves recycling for glass containers, PET bottles, aluminum cans, cartons, and some HDPE beverage containers. Both EPR and PCR lead to increases in sorting efficiencies post-collection. Figure 8 shows the recycling rate for each material category under Scenario 1 compared to the status quo.

Figure 8: Scenario 1 Recycling Rates versus Status Quo



Following is a review of the modeled impacts for each of the material categories presented above:

- **Rigid plastics.** The DRS system is effective at recycling PET and non-milk HDPE beverage bottles with a redemption rate of 90%. PET bottles comprise one quarter of all rigid plastics generated; the remainder is mostly non-beverage rigid plastic, which must be collected through a curbside or depot program. Under Scenario 1, most of these non-beverage rigid plastics are accepted in curbside programs. However, their capture rates are lower than the 90% redemption rate for PET bottles. These non-deposit materials bring the recycling rate down to 52%, a 38-point increase over the status quo.

- **Flexible plastics.** Under this scenario, curbside programs accept mono-material flexible plastics, while neither curbside or depot programs accept multi-material flexible plastics. Additionally, the model shifts one third of multi-material flexibles into mono-resin flexibles, due to assumed eco-modulation in an EPR program. The US Plastic Pact has stated it will switch its non-recyclable material into a recyclable format by 2025.[66] The US Plastic Pact covers around one third of the plastic packaging market in the US; this is the basis for the assumed one-third switch from multi to mono-resin flexible packaging. After the shift into mono-resin flexibles, 60% of the flexible plastic generated is mono-material with the remaining being multi-material. Therefore, only 60% of flexible plastics are eligible for curbside material acceptance even after the switches, leading to an overall flexibles recycling rate of 14%; this is lower than each of the other five material categories. The recycling rate is an improvement of 13 points over the status quo.

- **Paper.** The paper recycling rate increases by 24 points compared to the status quo. Paper materials (including cardboard, mixed paper, and other paper packaging) are all collected through curbside programs under EPR in this scenario. Expanded access and improved curbside capture rates mean the paper recycling rate reaches 75%, higher than the other two materials not collected through the DRS (steel and flexible plastics).

- **Aluminum.** Under this scenario, aluminum beverage cans can be collected through the DRS program with a redemption rate of 90%, and additional material collected through curbside results in an overall aluminum can recycling rate of 95%. Other aluminum products (e.g., food trays, pet food, foil), however, must be collected at curbside, with a recycling rate of 58%. Slightly more aluminum cans are generated than other types of aluminum, and thus recycling rate for the entire aluminum category is 78%.

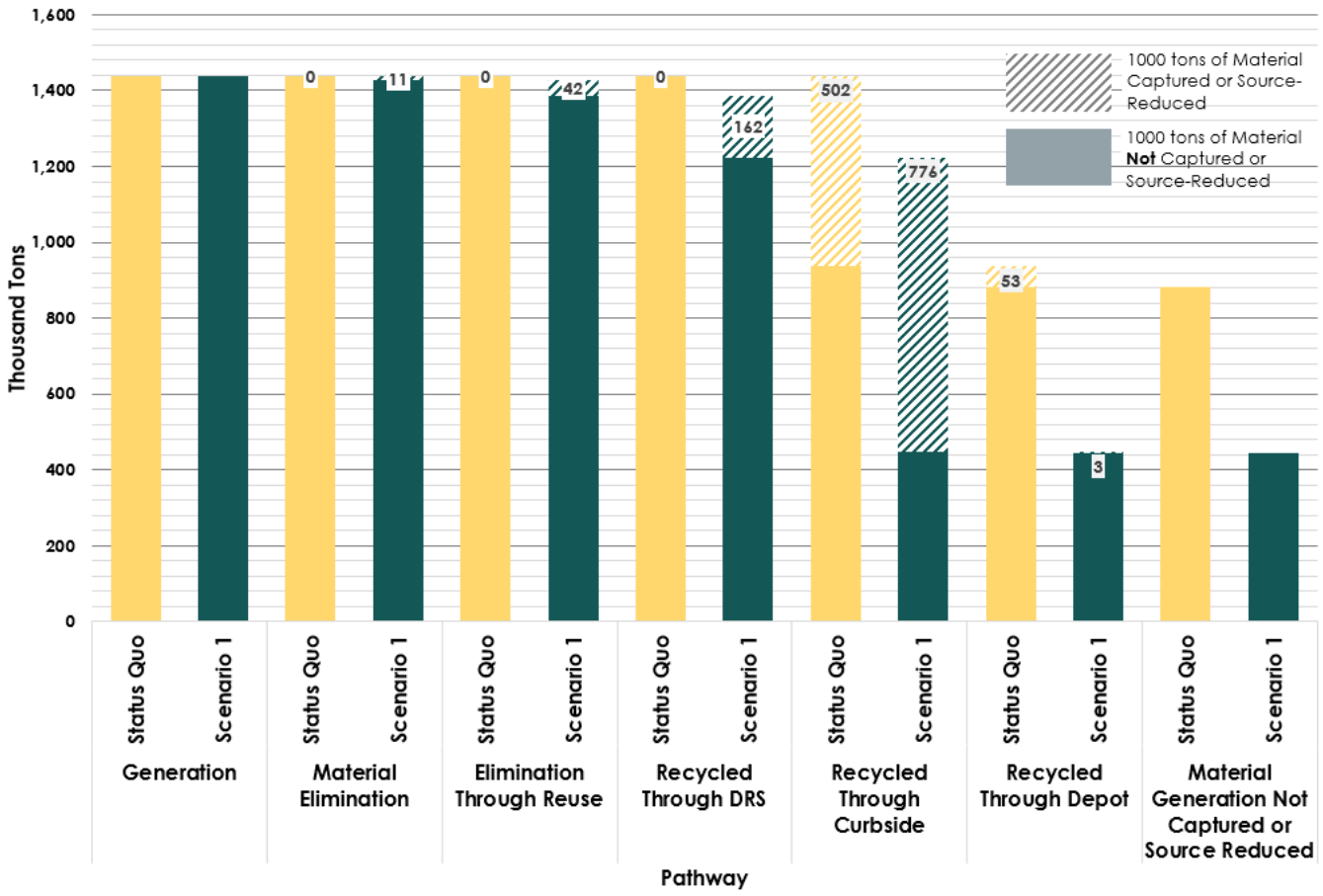
- **Steel.** Steel cans are collected through curbside programs for all households under the modeled EPR program. The resulting recycling rate is 65%, lower than the recycling rate for paper (75%), which is also universally collected at curbside. The curbside capture rate for steel cans is lower than those for paper and other common recyclables. This is consistent with national data, which also shows steel cans having capture rates lower than PET and HDPE bottles, paper, and aluminum cans.[67] This may be due to the size and substance of the products for which steel cans are used. Generally steel cans contain food, either for human or pet consumption, and might require cleaning prior to placement in the recycling bin. This extra step, which paper does not undergo, might explain the slight difference in capture rates.

- **Glass**. Glass has a recycling rate of 86% under this scenario. Of the four categories with material accepted under the DRS (glass, aluminum, rigid plastics, paper), glass has the highest proportion eligible for deposit return – 72% of glass containers are eligible for deposit return. This compares to 47% for aluminum, 23% for rigid plastics, and 1% for paper. Because the DRS has a redemption rate of 90%, and glass has the highest proportion of deposit-bearing containers, it has the highest recycling rate of 86% under this scenario.

To incorporate the benefits of reuse, the project team also calculated the reduction in generation and disposal tonnages for each scenario. Figure 9 shows the reduction in disposal resulting from each management pathway under Scenario 1 versus the status quo. The figure compares the tonnage diverted at each potential pathway through

material elimination, reuse, recycling through DRS, recycling through curbside, or recycling though a depot. As EPR systems accept more material curbside, including films, fewer and fewer tons are diverted via depots; however, depots still provide recycling for harder to recycle material like EPS. The hashed bars show the tonnage diverted at each management pathway, allowing for comparison against the status quo. The final set of bars on the right-hand side represent the total quantity of material disposed for Scenario 1 versus the status quo.

Figure 9: Tonnage of Material Diverted Through Each Pathway under Scenario 1



Key findings from the above figure for Scenario 1 include the following:

- Roughly 11,000 tons of material are eliminated versus the baseline. This is due to the EPS ban, which has effective dates in 2023 and 2024.[68] An additional 42,000 tons of material are source-reduced via reuse operations under this scenario compared to none under the status quo. The 42,000 tons derive from the source reduction of 3% of overall consumer packaging and paper products.

- The DRS results in 162,000 tons of recycled material under this scenario, while the status quo does not include a DRS.

- Curbside collection expands, resulting in 776,000 tons of material being recycled via curbside operations. This is a 54% increase in curbside recycled tonnage over the status quo.

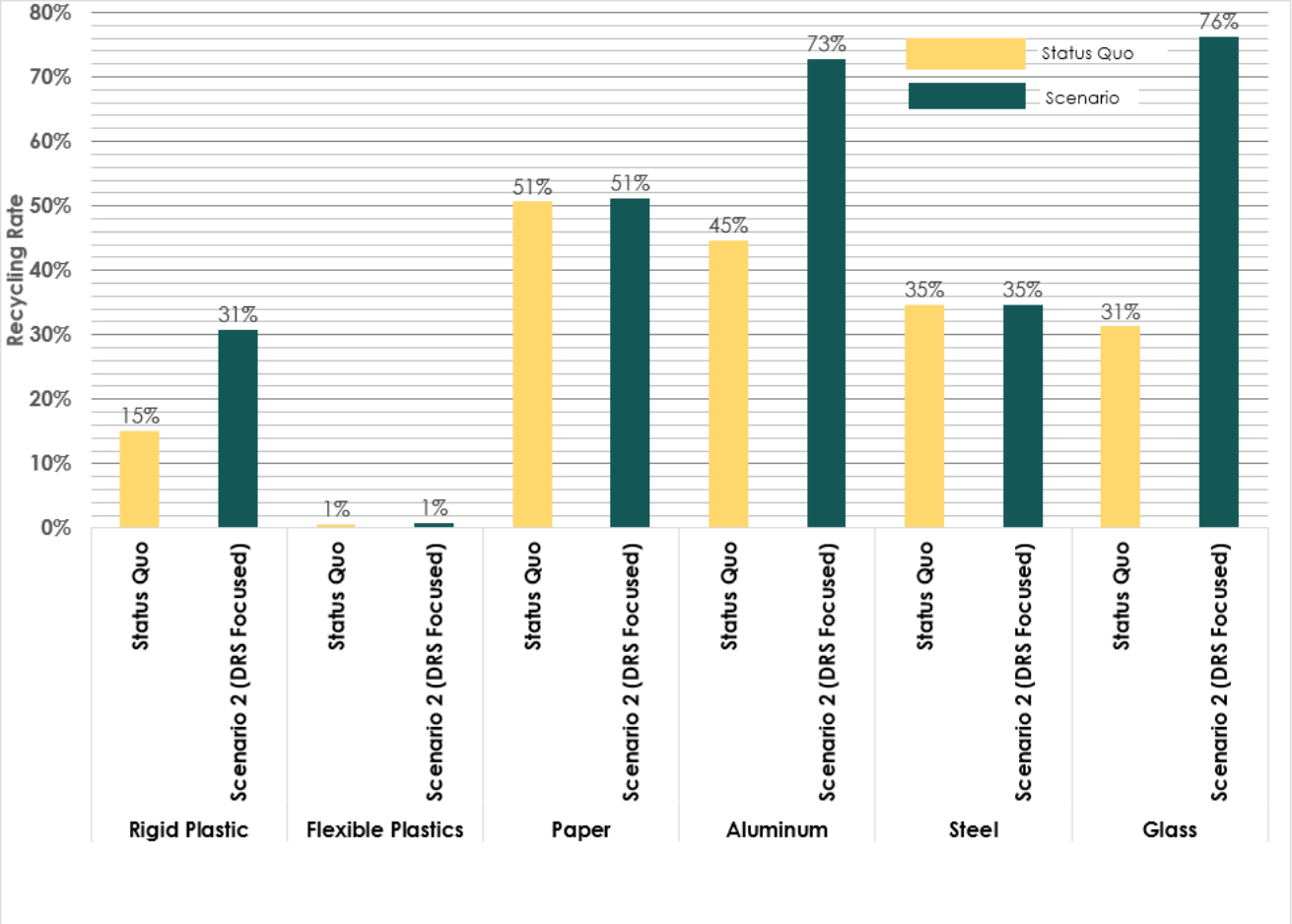
- Because curbside collection expands to all households with selected materials collected via depot only, there is a significant reduction in depot-collected material from the status quo (53,000 tons to 2,000 tons).

- Roughly 940,000 tons of material are captured for recycling or reuse, compared to 555,000 tons under the status quo (an 80% increase over status quo). The total recycling rate under this scenario is 70%.

2.6.2 Scenario 2: DRS Focused Scenario

Under the DRS focused scenario, beverage containers with a deposit achieve a redemption rate of 90%. There is no expansion of curbside service or curbside material acceptance for customers who already have service. Existing PCR requirements drive market demand for PET, PP, and HDPE and therefore these resins see improved sorting efficiencies. There is reuse for beverage containers only under this scenario, as well as an EPS ban. Figure 10 shows the recycling rate results under this scenario versus the status quo.

Figure 10: Recycling Rates under Scenario 2 versus Status Quo



Key findings from the above figure for Scenario 2 include the following:

- The materials that see recycling rate increases are rigid plastics (including PET beverage containers), aluminum (used beverage containers (UBCs), and glass containers. Flexible plastics and steel food cans are

not covered by the DRS nor impacted by the PCR requirements, so there is no change to recycling of these product types under this scenario. Paper does not see an increase in recycling because only non-milk cartons are accepted in the DRS program; this is a small enough tonnage that it does not change recycling compared to the status quo.

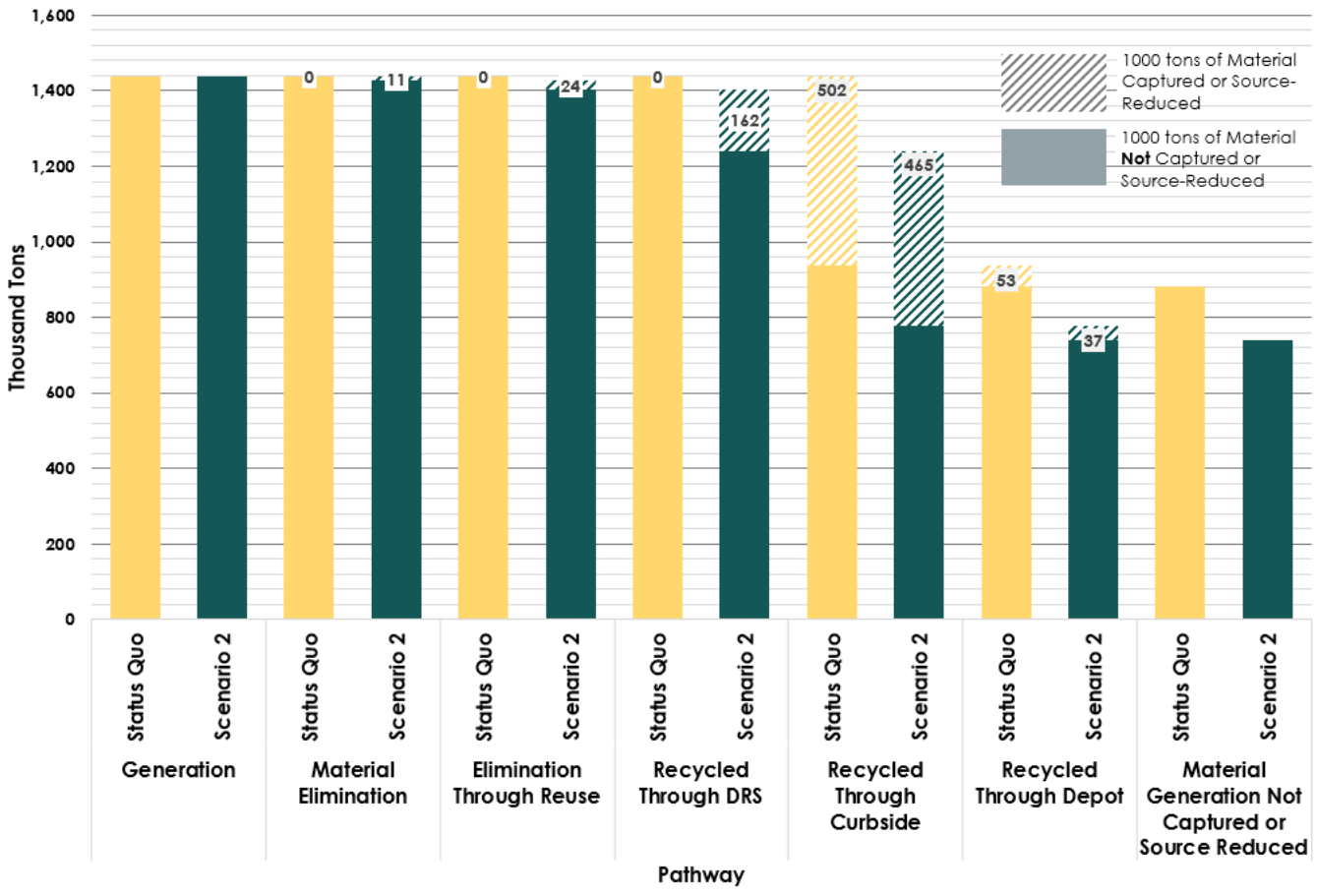
- Glass sees the largest increase in recycling rate at 45 percentage points, from 31% to 76%. Glass includes the largest proportion of beverage containers out of all the material categories, so the DRS therefore impacts the total glass category the most.

- This scenario produces a 28-point increase for aluminum over the status quo, as aluminum beverage cans are in scope of the DRS and have an average DRS redemption rate of 90%.

- The DRS impacts only PET and HDPE beverage containers within the rigid plastics category, while the PCR requirements lead to higher sorting efficiencies for PET, HDPE, and PP at MRFs. The overall increase in rigid plastic recycling is 16 percentage points, from 15% to 31%. Beverage containers comprise a quarter of overall rigid plastics generation, and thus 75% of the rigid plastic category does not have improved collection under this scenario, resulting in only an 18-point increase (compared to 45 points for glass and 28 points for aluminum).

Figure 11 shows the tonnage of material diverted through each pathway for Scenario 2.

Figure 11: Tonnage of Material Diverted Through Each Pathway for Scenario 2



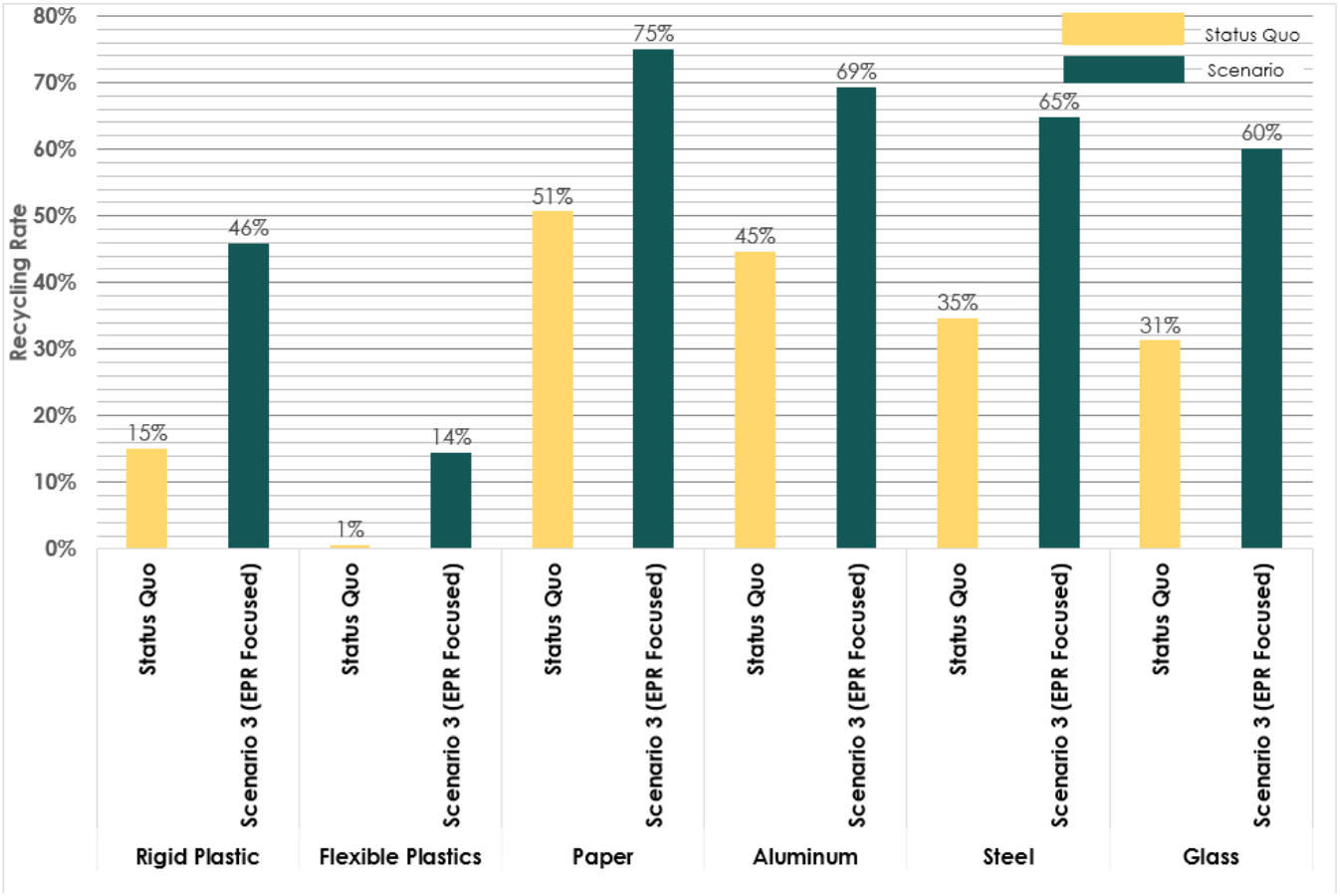
Key findings from the above figure for Scenario 2 include the following:

- A small amount of material is eliminated as a result of the EPS ban in Washington.
- 24,000 tons of eliminated material are associated with reuse, or around half of the tonnage reduced in Scenario 1. This is because, under Scenario 2, a reuse network only exists for beverage containers, excluding other non-beverage packaging.
- The DRS collects 162,000 tons, the same amount as under Scenario 1. The status quo does not include a DRS, so no tons are currently recycled through the DRS. Curbside recycling does not expand, and improved sorting efficiencies increase for only PET, HDPE, and PP containers. Because the DRS collects some material previously recycled via the curbside program, with no large increase in the collection of material, the tonnage of material collected through curbside programs decreases in Scenario 2 from the status quo. A total of 502,000 tons were recycled via the curbside programs under the status quo, while 465,000 tons are recycled under Scenario 2. The total material recycled, however, is still greater under Scenario 2 than the status quo.
- The total tonnage recycled under this scenario is 664,000 tons, compared to 555,000 tons under the status quo. This is a 20% increase in recycled tonnage over the status quo. The overall recycling rate improves from 40% under the status quo to 50% under Scenario 2.

2.6.3 Scenario 3: EPR Focused Scenario

Under Scenario 3, EPR expands curbside recycling to all of Washington, and there is a uniform accepted list of materials collected. Reuse exists for beverage and non-beverage products. Existing PCR requirements and the EPS ban are in place, but there is no DRS.

Figure 12: Recycling Rates under Scenario 3 versus Status Quo

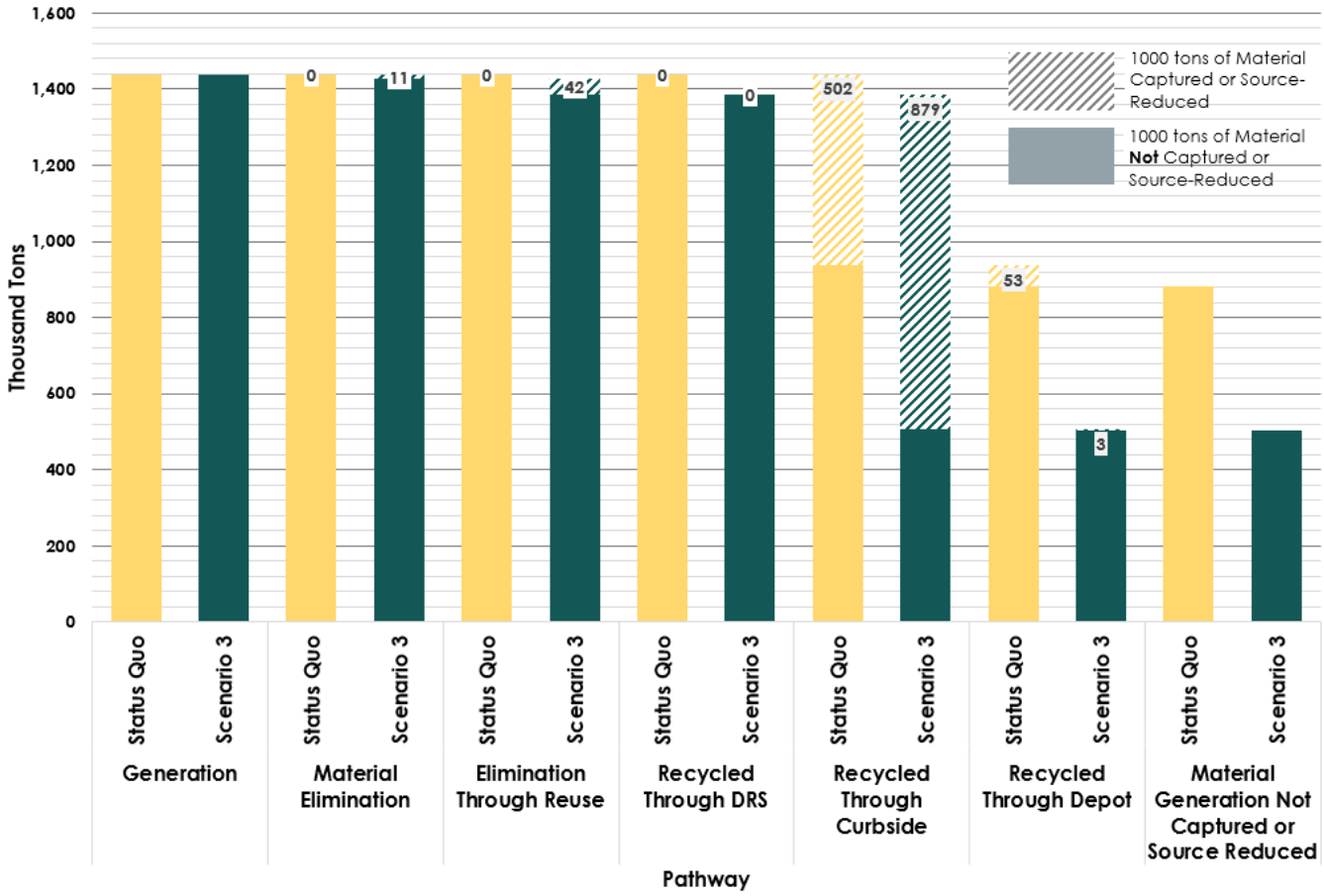


Key findings from the above figure for Scenario 3 include the following:

- Under Scenario 3, all material categories see an increase in recycling rates over the status quo, but glass and aluminum have lower recycling rates than Scenario 2 (DRS focused).
- Curbside expansion leads to a 29-point increase for rigid plastics, as more plastic resins and formats are accepted under the curbside program than in the status quo. The program also accepts mono-material plastics, but only for flexibles, so the recycling rate is lower than for the other materials. Mono-material flexibles make up around half of the flexible plastics generated.
- The paper recycling rate rises to 75%, similar to Scenario 1, as curbside programs under EPR are the main driver for increased paper recycling.
- Aluminum cans and non-can materials (e.g., foil, food trays) are both included in curbside programs under Scenario 3. As the recycling rate for aluminum cans under the EPR curbside program is not quite as high as the 90% redemption rate under a DRS in Scenario 2, the recycling rate under Scenario 3 is slightly lower than in Scenario 2. The aluminum recycling rate is 24 points higher in Scenario 3 than the status quo.
- Steel has a 65% recycling rate, the same as Scenario 1, as steel cans are only accepted through curbside and depot programs and not through other pathways.

- Glass increases to a 60% recycling rate, a 29-point increase over the status quo. This recycling rate is 16 points lower than the recycling rate in Scenario 2, as the DRS captures a higher percentage of the glass materials than the curbside program. The glass recycling rate is 26 points lower than Scenario 1, when the curbside program under EPR and a DRS combine to capture material.

Figure 13: Tonnage of Material Diverted Through Each Pathway under Scenario 3



Under Scenario 3, there are similar levels of avoided generation due to reuse, as in Scenario 1, and more than in the status quo scenario. Among all scenarios, Scenario 3 has the largest tonnage of material accepted through the curbside recycling program at 879,000, a 75% increase over the status quo. No material is collected through a DRS under Scenario 3. The total tonnage recycled is 880,000 tons, 59% higher than the status quo, and 60,000 tons fewer than Scenario 1.

Around 4,000 tons of material would be recycled through the depot collections, primarily harder to recycle plastics such as EPS and #7 plastics.

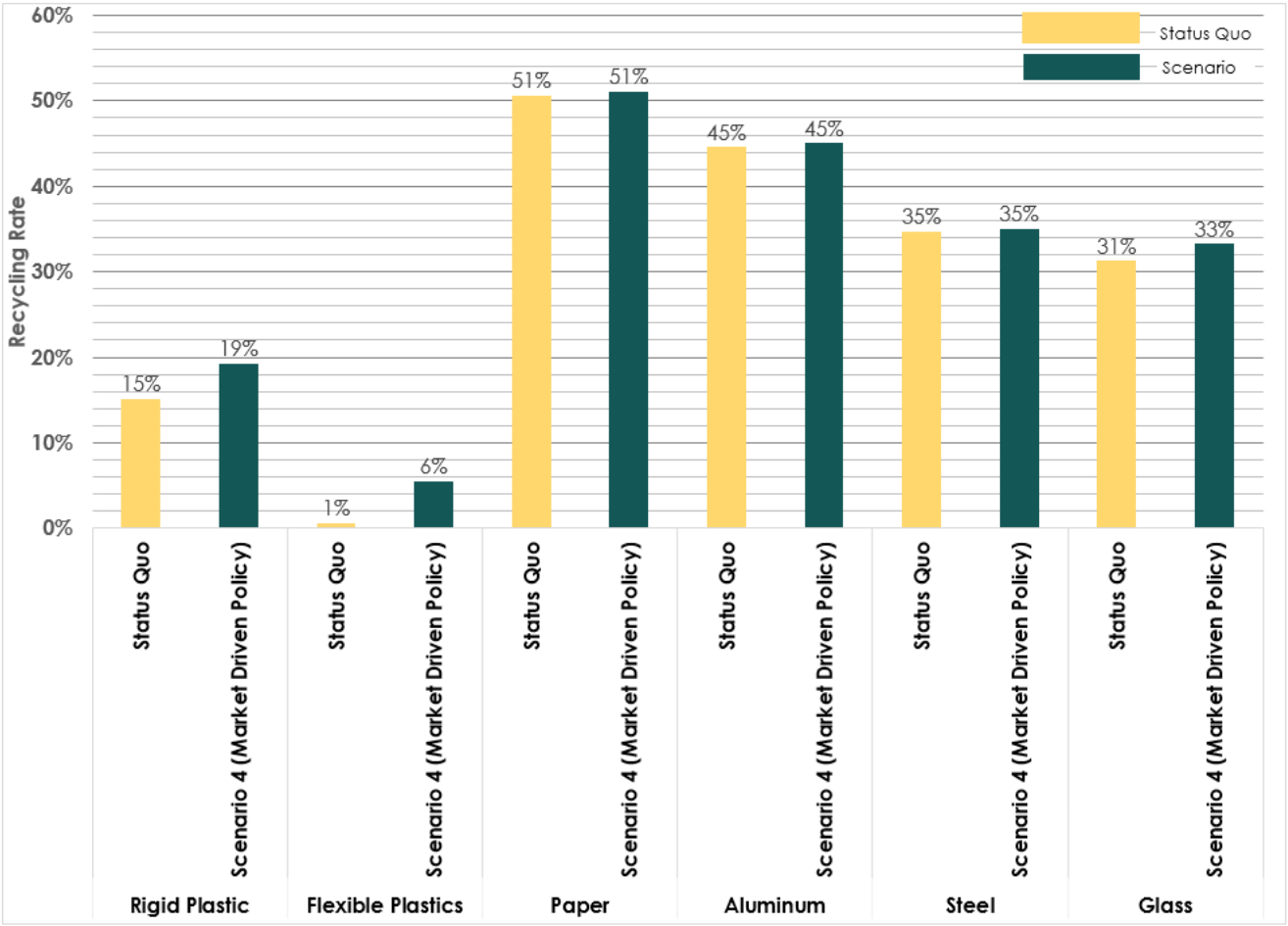
In total, 488,000 tons of material are discarded under Scenario 3 compared to 880,000 tons under the status quo, a 42% decrease. The overall recycling rate reaches 66% under Scenario 3, compared to 40% for the status quo.

2.6.4 Scenario 4: Market-Driven Policy Scenario

Under the market-driven scenario, policies include a statewide uniform collection list, expanded PCR requirements, and truth-in-labeling. Curbside material acceptance expands for materials that are already widely accepted at baseline, and thus are marketable. This expansion only applied to households already covered by curbside collection services and not to new households. An expanded uniform depot material acceptance list is established for all households. PCR requirements exist for plastic beverage containers, plastic cleaning products, plastic wine containers, flowerpots, and single-use plastic cups. Truth-in-labeling is required on products.

Figure 14 shows the recycling rates for Scenario 4 compared to the status quo.

Figure 14: Recycling Rates under Scenario 4 versus Status Quo

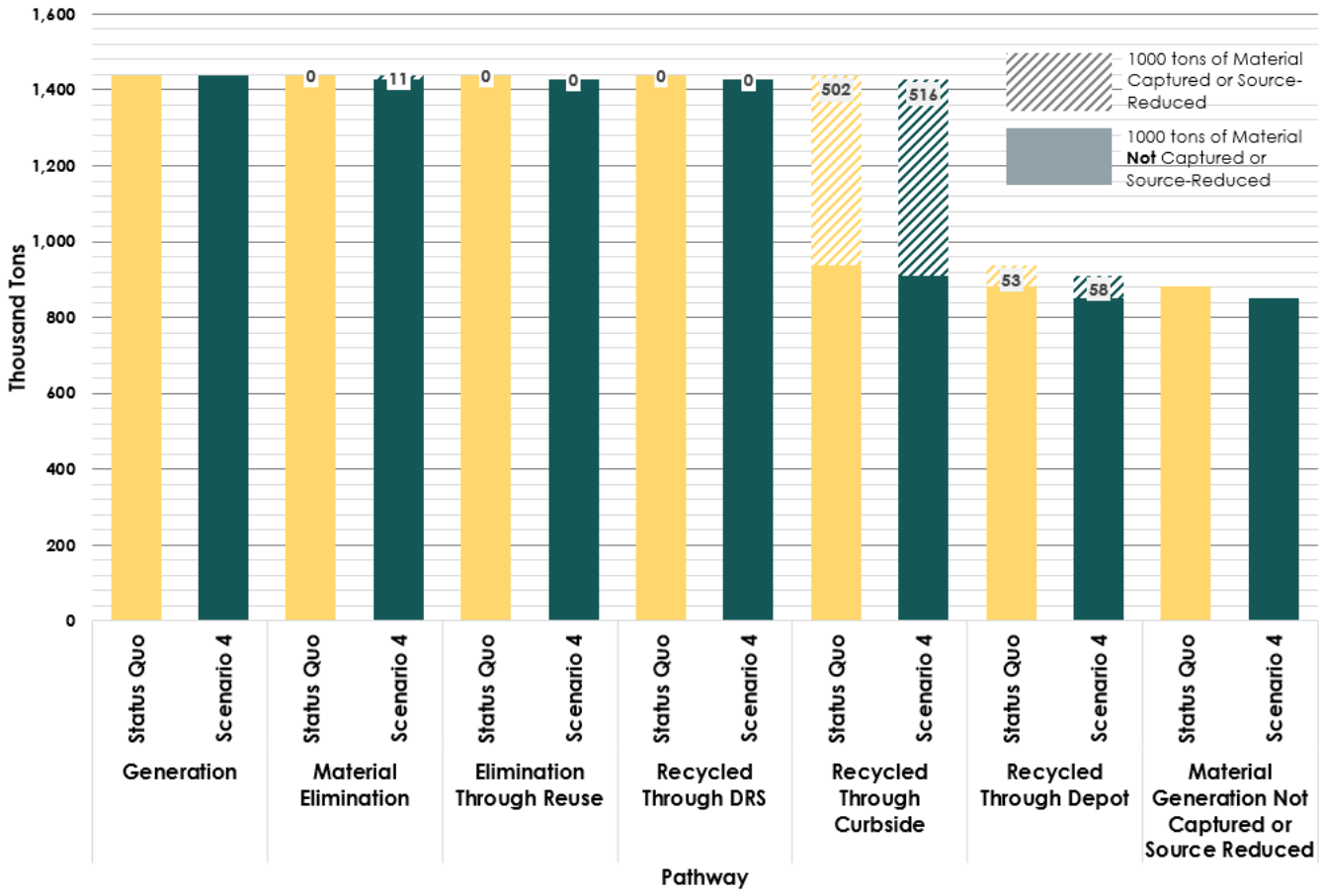


- Under Scenario 4, recycling rates do not materially increase for paper, aluminum, or steel. The larger subcategories of these materials were widely accepted at baseline already for those households with recycling service, so fewer services need to be added. Rigid plastic recycling rates rise by 5 points as PP containers are added to all households who already have curbside recycling access. Likewise, glass containers are accepted at curbside under Scenario 4 for all households who already had service at baseline, so the recycling rate increases by 2 percentage points from 31% to 33%.

- As a result of the uniform depot list, depots accept mono-material flexible film for all households. This results in an overall recycling rate of 6% for all flexible film.

Figure 15 shows the tonnage of material through each pathway.

Figure 15: Tonnage of Material Diverted Through Each Pathway under Scenario 4

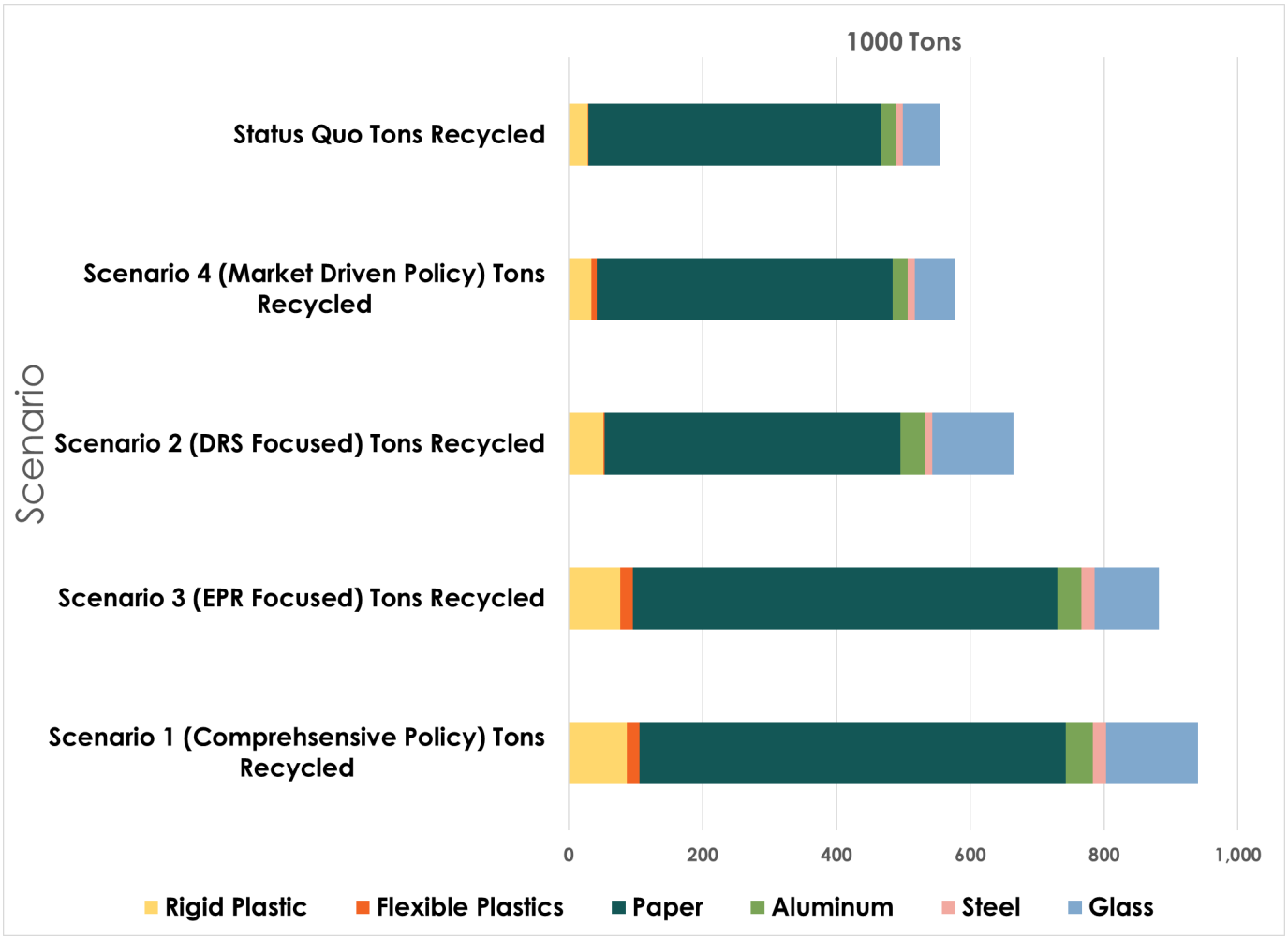


Under Scenario 4, there is no DRS and only a slight increase of tonnage recycled through curbside. There is no additional curbside service for households who did not have it and no initiatives to improve curbside capture rates to best-in-class. Scenario 4 does not include reuse. The increase in total tonnage recycled compared to the status quo is 20,000 tons, or 4%. The recycling rate increases from 40% to 41% under the status quo scenario.

2.6.5 Scenario-by-Scenario Comparison

Figure 16 compares the findings from each scenario. The chart shows the recycling totals for each scenario, separated by material category. The first bar shows the total generation of single-use packaging, while each subsequent bar shows the tonnage recycled under a given scenario.

Figure 16: Tons Recycled under Each Scenario (2032)



Scenario 1 results in the greatest tonnage of material recycled (940,000 tons), a 70% increase over the status quo. Scenario 1 has the greatest tonnage recycled for each material category, as the DRS and EPR systems work in tandem to collect material through both the redemption stream and the curbside recycling stream. Within the recycled material categories, paper accounts for the most material, comprising 68% of the recycled tonnage. The next highest total is glass, which accounts for 15% of the recycled tonnage. The amount of glass recycled increases by 151% (83,000 tons), while the amount of rigid plastic recycled triples (an increase of 58,000 tons) compared to the status quo.

Scenario 3 has the second highest tonnage recycled of the four scenarios, with a 59% increase over the status quo. This scenario includes EPR for curbside and recycles 635,000 tons of paper, compared to the non-EPR scenarios (Scenarios 2 and 4), which do not expand curbside to the same degree and recycle 442,000 tons of paper each. Glass recycling in Scenario 3 is not as great as in Scenario 1 due to the absence of a deposit return system (DRS) for glass beverage containers. Flexible plastics are recycled in the greatest quantities in Scenarios 1 and 3 as mono-resin flexible plastics are added to the curbside program.

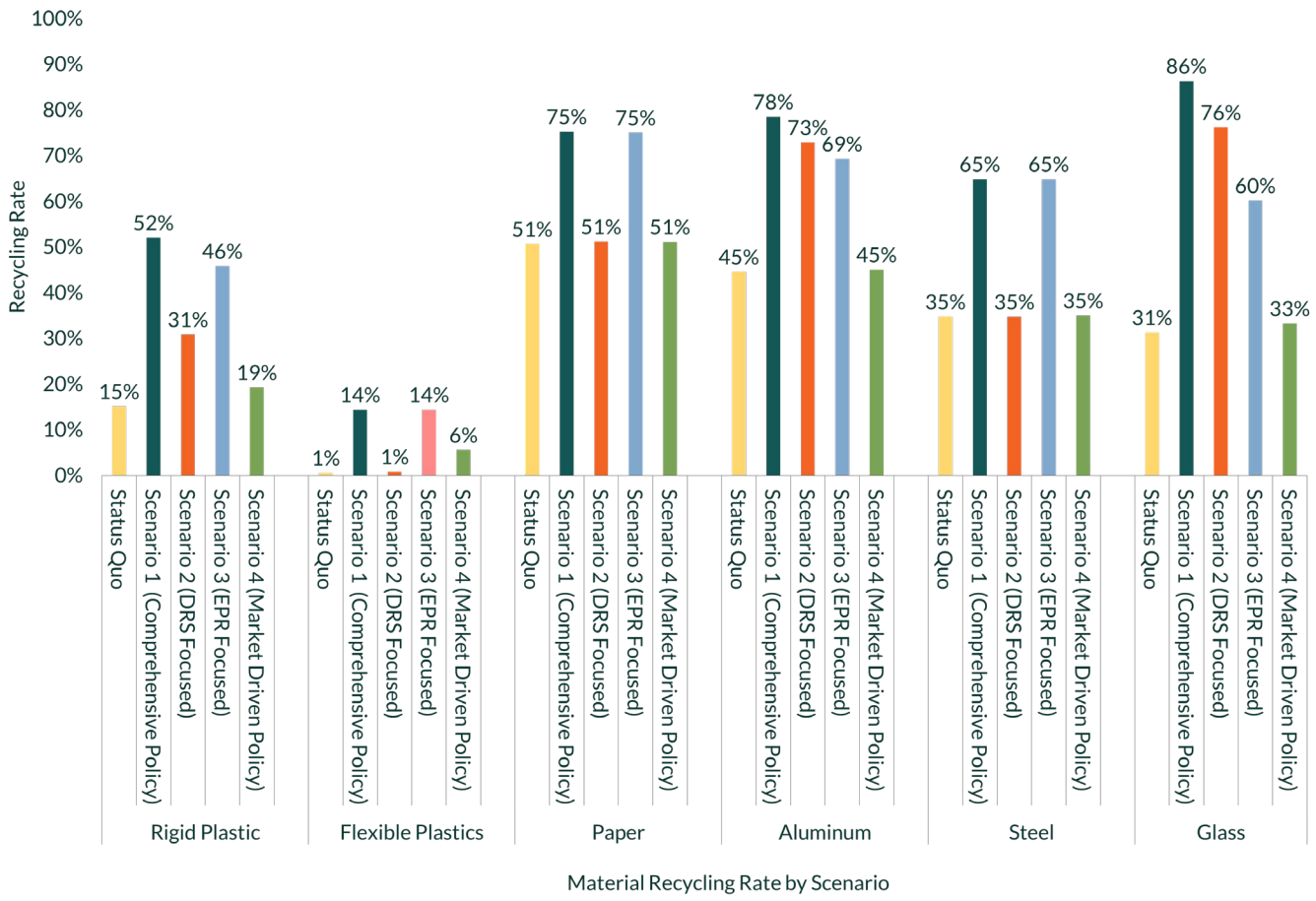
Scenario 2 includes only a DRS for beverage containers, existing PCR requirements, and beverage container reuse. These initiatives result in increases in recycled tonnage for rigid plastics, glass, and aluminum. In total, the recycled

tonnage increases by 20% under Scenario 2 when compared to the status quo. Aluminum tonnage recycled increases by 64% (14,000 tons), rigid plastic recycling increases by 83% (23,000 tons), and glass recycled tonnage increases by 122% (67,000 tons).

Under Scenario 4, total tonnage recycled increases by 4% over the status quo. There is no EPR or DRS in Scenario 4, and no additional households have curbside collection. Paper, aluminum, and steel each see a 1% increase. Rigid plastics see a 20% increase in tonnage recycled (6,000 tons) as existing curbside programs add PP rigid plastics and PCR requirements drive investment to improve plastic sorting efficiencies at MRFs.

Figure 17 shows the recycling rate of materials under each scenario.

Figure 17: Recycling Rates Under Each Scenario



The overall recycling rate for consumer packaging and paper products reaches 70% under Scenario 1, a 30-point increase over the status quo. Additionally, Scenario 1 has the highest recycling rates for each material category. This scenario includes both a DRS and EPR in addition to the existing PCR legislation. Glass has an 86% recycling rate under this scenario, compared to the next highest of 76% under Scenario 2. This 10-point difference in recycling rate is the greatest for any one material between its highest and second highest recycling rates under two scenarios. This highlights how glass benefits greatly from both an EPR and DRS. The second biggest gap between recycling rates in Scenario 1 and the next highest scenario is rigid plastic, which has a 52% recycling rate in Scenario 1 and a 46%

recycling rate in Scenario 3, a gap of 6 percentage points. Scenario 1 also has the highest recycling rate for flexible packaging at 14%, as mono-material flexibles are accepted through the curbside program under EPR.

Scenario 2 shows increases in recycling rates for rigid plastics (+18 points), aluminum (+28 points), and glass containers (+45 points). As no policies impact curbside collection under this scenario, paper, steel, and flexible plastics do not see any material increases in their recycling rates. The overall recycling rate reaches 49% for all CPPP under Scenario 2, a 9-point increase over the status quo.

Scenario 3 shows increased recycling rates for all materials, and particularly for paper and steel. Paper and steel are collected through curbside programs, and thus the expansion of curbside under EPR drives higher recycling rates for each of these material streams. The recycling rate of glass containers under Scenario 3 is 60%, 16 points lower than in Scenario 2, and 26 points lower than in Scenario 1. The existence of a DRS may account for an additional 26-point increase in the recycling rate of glass containers (the difference between Scenarios 1 and 3). The overall CPPP recycling rate under Scenario 3 is 66%. This is 17 points higher than in Scenario 2, as paper makes up such a large proportion of the recycling stream, and therefore increasing its recycling rate positively impacts the overall recycling rate.

Under Scenario 4, the material with the largest percentage point increase is rigid plastics, which see a 5-point rise in recycling rate over the status quo. On a material-by-material basis, the percentage point increase from Scenario 4 varies from 0 to 5 points depending on material type.

In terms of material quality, a deposit return system is likely to produce higher quality recycled material when compared to curbside. Deposits can decrease contamination levels and reduce the need for additional sorting post-collection, resulting in fewer material losses throughout the process.[69]

2.7 Recommended Targets

This section recommends target rates for recycling by 2023, as required under the WRAP Act.[70] The recommendations are informed by the materials flow modeling conducted for this study and by recycling targets and actual performance in other jurisdictions. The target recommendations for reuse are informed primarily by targets from other jurisdictions, as well as justified in their feasibility by some of the modeling results.

2.7.1 Recycling Targets

The recycling targets outlined here take into consideration the targets from other jurisdictions as well as the modeled recycling rates from Section 2.6. All targets are designed to be achievable for 2032. The recommended targets for the four scenarios include the following policy actions (each scenario already includes truth-in-labeling):

1) Scenario 1: EPR, DRS, PCR requirements and reuse
2) Scenario 2: DRS with PCR requirements and beverage container reuse
3) Scenario 3: EPR with PCR requirements and reuse
4) Scenario 4: Market-driven recycling, with PCR requirements

Table 15 summarizes the recommended recycling targets by material category for each scenario. Scenario 1 provides the highest recycling targets, followed by Scenario 3, Scenario 2, and Scenario 4. Discussion of each scenario and the recommended recycling target follows for each material category.

Table 17: Summary of Recommended 2032 Recycling Targets

Material	Current Rate	Scenario 1 – Comprehensive Policy	Scenario 2 – DRS Focused	Scenario 3 – EPR Focused	Scenario 4 – Market-Driven Policy
Rigid Plastic	15%	60%	35%	50%	19%
Flexible Plastic	1%	20%	5%	20%	5%
Paper	51%	80%	55%	80%	51%
Aluminum	45%	75%	70%	70%	45%
Steel	35%	70%	40%	70%	35%
Glass	31%	80%	75%	60%	33%

2.7.1.1 Scenario 1

Under Scenario 1, a DRS and EPR program are both established with PCR and reuse requirements. This is a similar arrangement to other jurisdictions with recycling targets, such as Quebec, California, and Oregon. Ontario has EPR with a DRS limited to alcoholic containers, and the European Union has a mix of Member States with EPR programs which do and do not include DRS. Below is a list of jurisdictions that have established targets and have both an EPR

and DRS which covers most beverage containers. For a full list of the jurisdictional targets, see Appendix A.1.1. This section presents the modeled recycling rates, compared to the current recycling rates and the targets in other jurisdictions, on a material-by-material basis.

As shown in Table 18, the modeled rigid plastic recycling rate is lower than the target rate for Quebec by 2037 (75%-90%), higher than Oregon's rate for 2028 (25% for all plastic packaging), and the same as the European Union's target for all plastic packaging (55%). As the target rates for the European Union include flexibles, which will have a lower recycling rate than rigid, it is reasonable to expect the rigid plastics will have a higher recycling rate than 55% if they meet the target. For these reasons, Eunomia recommends **a target rate of 60% for rigid plastic recycling,** slightly higher than the modeled result.

Table 18: Rigid Plastics Targets under Scenario 1 and Comparison to Jurisdictions

Material	Current Recycling Rate	2032 Target	Target Year
Oregon	13.7% *for all plastic packaging*	25% *for all plastic packaging*	2028
Ontario	39%	60%	2030
European Union	37% *for all plastic packaging*	55% *for all plastic packaging*	2030
Quebec	55%	75-90%	2037
Modeled (calculated for current rate) in Washington	15%	52%	2032
Recommended	**-**	**60%**	**2032**

Flexible plastics, as shown in Table 19, have a 50% recycling target in Quebec by 2027; however, all packaging in Oregon and the European Union have target rates of 25% and 55%, respectively. Flexible plastics are likely to be below these target rates, and instead the total plastic packaging category would likely be lifted by rigid plastics. Ontario has a flexible plastic packaging recycling target of 40%, but curbside flexible plastic packaging is already established in this jurisdiction. Eunomia modeling produces a recycling rate of 14%. However, in comparison with other jurisdictions, the target rate is recommended to be higher than this calculated rate. Taking into consideration that flexible plastic packaging is not currently collected at the curbside in Washington, Eunomia recommends **a flexible plastic packaging target recycling rate of 20%**.

Table 19: Flexible Plastics Targets under Scenario 1 and Comparison to Jurisdictions

Material	Current Recycling Rate	Target	Target Year
Quebec	24%	50%	2027
Oregon	13.7% for all plastic packaging	25% for all plastic packaging	2028
Ontario	9%	40%	2030

European Union	37% for all plastic packaging	55% for all plastic packaging	2030
Quebec	24%	85%	2062
Modeled (calculated for current rate) in Washington	1%	14%	2032
Recommended	**-**	**20%**	**2032**

The paper recycling rate under Scenario 1 is 75%. This is slightly below the targets for the jurisdictions listed in Table 20. Paper currently has a recycling rate of 51%. Eunomia recommends **a target rate for paper of 80%** based on the modeled results and the targets from other jurisdictions.

Table 20: Paper Targets under Scenario 1 and Comparison to Jurisdictions

Material	Current Recycling Rate	Target	Target Year
Oregon	None published	None established	
Ontario	67%	85%	2030
European Union	81.5%	85%	2030
Quebec	71%	85% paper, 90% cardboard	2032
Modeled (calculated for current rate) in Washington	51%	75%	2032
Recommended	**-**	**80%**	**2032**

The steel can recycling rate under Scenario 1 is 65%, lower than the rest of the targets in other jurisdictions (see Table 21). Eunomia recommends **a recycling target of 70% target for steel cans**; this is slightly higher, as there is still potential to increase curbside capture rates.

Table 21: Steel Can Targets under Scenario 1 and Comparison to Jurisdictions

Material	Current Recycling Rate	Target	Target Year
Quebec	62% all steel containers	75%	2027
Oregon	None published	None established	
Ontario	73%	75% for all metal	2030
European Union	None published	80%	2030
Modeled (calculated for current rate) in Washington	35%	65%	2032
Recommended	**-**	**70%**	**2032**

Table 22 shows aluminum targets. The only jurisdictions to mention aluminum separately from other metals are Quebec and the European Union. Quebec has a 55% target recycling rate by 2027 and 80% by 2052. The European Union has a target recycling rate of 60% by 2030 but is currently stating it has a 75% recycling rate for the material. The modeled results are 78% for aluminum under Scenario 1**.** Eunomia recommends **a slightly more conservative recycling target of 75% for aluminum** than the modeled results, as an achievable recycling rate in line with other targets.

Table 22: Aluminum Targets under Scenario 1 and Comparison to Jurisdictions

Material	Current Recycling Rate	Target	Target Year
Quebec	54%	55%	2027
Oregon	None published	None established	
Ontario	52%	75% for all metal	2030
European Union	None published	60%	2030
Quebec	54%	80%	2052
Modeled (calculated for current rate) in Washington	45%	78%	2032
Recommended	**-**	**75%**	**2032**

For glass, as shown in Table 23, Eunomia modeling revealed an 86% recycling rate. In comparison with other jurisdictions, this may be optimistic given the starting recycling rate of 31%. However, as glass can see large increases through a DRS by itself, Eunomia recommends **a recycling rate target of 80% for glass containers**.

Table 23: Glass Targets under Scenario 1 and Comparison to Jurisdictions

Material	Current Recycling Rate	Target	Target Year
Quebec	79%	70%	2027
Oregon	None published	None established	
Ontario	77%	85%	2030
European Union	76%	75%	2030
Quebec	79%	85%	2042
Modeled (calculated for current rate) in Washington	31%	86%	2032
Recommended	**-**	**80%**	**2032**

Table 24 shows a summary of the recommended targets under Scenario 1:

Table 24: Summary of Recycling Targets for Scenario 1

Material	Current Recycling Rate	Recommended Recycling Target for Scenario 1
Rigid Plastic	15%	60%
Flexible Plastic	1%	20%
Paper	51%	80%
Aluminum	45%	75%
Steel	35%	70%
Glass	31%	80%

2.7.1.2 Scenario 2

Under Scenario 2, only a DRS program is established and PCR requirements improve sorting efficiencies at the MRF stage of the waste flow for covered plastics. DRS is a relatively common legislative measure in the US, having been enacted since the 1970s and 1980s.[71] There are currently 10 states in the US with DRS, including Oregon. These states tend to have higher recycling rates for covered materials on average than states without DRS.[72] Although states with DRS generally track redemption rates, they do not have systematic reporting for non-bottle waste flows to estimate recycling rates, as a jurisdiction with both DRS and EPR would have. Therefore, there are no reported recycling rates for DRS-only states for material categories which align with this study.

Material categories including beverage containers

Under this scenario, the primary assumption made was that the beverage container redemption rates would reach 90% for PET bottles, aluminum cans, and glass bottles. This was in alignment with reported performance of DRS systems in Alberta and Ontario. Consequently, the overall category recycling rates improved for rigid plastics, aluminum, and glass compared to 2021 performance. However, it is notable that none of these categories improved to the same recycling performance as modeled under Scenario 1. Eunomia recommends that Washington set the following recycling targets that meet this performance under this scenario:

- **Rigid plastics: 35%**
- **Aluminum: 70%**
- **Glass: 75%**

Without additional policy levers initiated, such as implementing EPR as Oregon has recently done, these material categories are unlikely to see considerably higher improvements than the performance modeled.

Material categories excluding beverage containers

For the material categories that do not include beverage containers, only improvements from higher MRF sorting efficiencies for PCR covered plastics were estimated, resulting in a small increase in recycling. However, Eunomia recommends setting targets that are still a few percentage points higher than the modeled DRS performance. The

idea is that this will motivate further non-beverage improvements to the recycling system. Additionally, educational and promotional roll-out of DRS may result in marginal improvements to overall recycling uptake. Therefore, following targets are recommended for these categories:

- **Flexible plastics: 5%**
- **Paper: 55%**
- **Steel: 40%**

Table 25 provides a summary of the recycling targets recommended if only DRS legislation is implemented in Washington by 2032, compared to 2021 recycling rates:

Table 25: Summary of Recycling Targets for Scenario 2

Material	Current Recycling Rate	Modeled Recycling Rate under Scenario 2	Recommended Recycling Target for Scenario 2
Rigid Plastic	15%	31%	35%
Flexible Plastic	1%	1%	5%
Paper	51%	51%	55%
Aluminum	45%	73%	70%
Steel	35%	35%	40%
Glass	31%	76%	75%

2.7.1.3 Scenario 3

Under Scenario 3, there is just EPR with existing PCR requirements and reuse targets. Few other jurisdictions have established recycling targets without consideration of a DRS. France is the only jurisdiction reviewed for this study which has established recycling targets without an existing DRS. France has a separate recycling target for beverage containers and plans to introduce DRS for glass beverage containers by 2025. Because no other jurisdictions have established targets without consideration of a DRS, the targets recommended under Scenario 3 are not comparable to existing jurisdictional targets. Table 26 shows the modeled recycling rates and recommended targets for Scenario 3.

Table 26: Recommended Targets under Scenario 3

Material Category	Current Recycling Rate	Modeled Recycling Rate under Scenario 3	Recommended Recycling Target for Scenario 3
Rigid Plastic	15%	46%	50%
Flexible Plastic	1%	14%	20%

Material Category	Current Recycling Rate	Modeled Recycling Rate under Scenario 3	Recommended Recycling Target for Scenario 3
Paper	51%	75%	80%
Aluminum	45%	69%	70%
Steel	35%	65%	70%
Glass	31%	60%	60%

Without a DRS, the glass recycling rate is lower than in Scenario 1; the rigid plastic and aluminum rates are also slightly lower. The recommended recycling rates for Scenario 3 are therefore similar to the recommended rates for Scenario 1, but with downward revisions for rigid plastic packaging, aluminum packaging, and glass containers.

2.7.1.4 Scenario 4

Under Scenario 4, recycling access and improvements are driven by policies focusing on markets. Only products which are commonly collected at baseline are expanded to all existing curbside systems. Small recycling increases were seen across material types over the status quo. Any targets established would be voluntary, and thus not enforceable, as they would fall under an EPR program. **Table 27 shows the modeled recycling rates and recycling targets for this scenario.** Targets are set at levels closer to the baseline (current recycling rates), with small improvements for sorting increases and voluntary targets. The recycling rates modeled were rounded up to the nearest 5 percentage points.

Table 27: Summary of Recycling Targets for Scenario 4

Material	Current Recycling Rate	Scenario 4 Recycling Rate	Recommended Recycling Target for Scenario 4
Rigid Plastic	15%	19%	19%
Flexible Plastic	1%	5%	5%
Paper	51%	51%	51%
Aluminum	45%	45%	45%
Steel	35%	35%	35%
Glass	31%	33%	33%

2.7.2 Reuse Targets

Reuse targets for the state were modeled on a product-by-product basis with the goal of comparing these to the targets from other jurisdictions. Reuse was modeled at the product use level (that is, a combination of packaging and usage of the packaging – for example, glass containers for beer, HDPE containers for milk) to allow for more accurate material flows, but the recommended rate is set at the overall packaging level. An overall reuse rate enables efficient analysis of how the target would impact the waste stream as a whole. Each of the products has a parent category (for example, the parent category for beer is “beverage containers”), which could be used as the category for targets.

Recommended targets are informed by the following:

- Targets proposed or established in other jurisdictions, as outlined in Table 28.
- Current levels of reuse for specific targets in other jurisdictions, as outlined in Table 28.
- Consideration of scale needed to have an impactful system, as established in Eunomia modeling (see Section 2.5.2).

Table 28 summarizes and compares target reuse rates in the EU and EU countries and in California. While European jurisdictions have noticeably higher reuse targets than California, the level of baseline reuse in Europe is higher than in the US. Most jurisdictions do not publish statistics on the current reuse rate. However, jurisdictions analyzed for this study, particularly in Europe, are further along in their reusable target setting process, and thus in establishing reuse systems. Where targets in other jurisdictions do not apply to the entire CPPP waste stream, an estimated percentage of the overall CPPP waste stream which these targets represent has been calculated in the "Implied Overall CPPP Reuse Target" column of Table 28. These calculated values (in bold) show the implied reuse rate for all CPPP for a jurisdiction based on those jurisdictions' more granular targets (i.e., summing up the individual reuse rates as a proportion of all CPPP). This has not been done for the European Commission targets, as they are the basis for the modeling performed in this study.

Table 28: Jurisdictional Comparison of Reuse Targets to Washington Modeling and Recommended Targets

	Jurisdiction	Year	Implied Overall CPPP reuse target	Overall packaging reuse target	All Beverage Containers	All plastic packaging	Beer	Wine	Milk	Carbonated beverages	Non-carbonated beverages	Takeaway foods	OCC e-commerce boxes	Cereals	Dry Pasta
1	Chile	2024	**4%**	-	30%	-	-	-	-	-	-	-	-	-	-
2	Sweden	2026	**16%**	20%	-	-	-	-	-	-	-	-	-	-	-
3	France	2027	**8%**	10%	-	-	-	-	-	-	-	-	-	-	-
4	Sweden	2030	**24%**	30%	-	-	-	-	-	-	-	-	-	-	-
5	Portugal	2030	**24%**	30%	-	-	-	-	-	-	-	-	-	-	-
6	Austria	2030	**4%**	-	30%	-	-	-	-	-	-	-	-	-	-
7	European Commission Draft Target Rate	2030	-	-	-	-	10%	5%	-	10%	10%	10%	10%	10%	10%
8	California	2032	**2%**	-	-	10%	-	-	-	-	-	-	-	-	-
9	European Commission Draft Target Rate	2040	-	-	-	-	25%	15%	-	25%	25%	40%	50%	25%	25%
10	Modeled Tonnage avoided as % of all Packaging Weight POM	2032	**3%**	-	-	-	0.7%	0.4%	0.1%	0.1%	0.4%	1%	0.4%	0.1%	<0.1%
11	Recommended Reuse Rate	2032	**5%**	-	-	-	-	-	-	-	-	-	-	-	-

In all the reuse modeling done for this study, the most expansive reuse scenario results in just 3% of all packaging weight placed on the market as being in reusables. This reveals the difficulty in presenting reuse rates at an overall packaging level.

While data is sparse, both Sweden and France are likely starting from a baseline greater than zero for the quantity of packaging that is in reuse containers.[73, 74,75] The Austrian government has set a target for 30% of all beverage containers to be in reuse by 2030. The weight of 30% of beverage containers in Washington would equate to about 4% of the overall waste stream.

Considering this data challenge, an overall reuse target of 5% is recommended; this is both in line with other jurisdictions and achievable, according to the modeling.

This is likely a higher reuse rate target than California's, as its reuse target only considers plastic packaging, which in Washington is only 21% of the packaging generated. California's rate would therefore relate to a 2% reuse rate overall if it had a similar packaging generation composition to Washington.

2.8 Study Constraints

While this study provides valuable results that inform target recommendations, it is essential to acknowledge the model limitations. Key limitations include data quality, limited sales data for reuse-eligible products, the lack of data on existing reuse systems in Washington State, the limitation of the study to the residential sector, and the potential need for temporal analysis.

Data quality

- While data quality remains generally consistent for recycling tonnages, it is critical to acknowledge that data concerning reuse in most jurisdictions is severely limited. Therefore, there is a need for greater transparency in the reporting of operational reuse systems to enable more robust modeling in future studies.
- The estimates for waste flows derive from generation figures. These generation estimates are calculated based on waste characterizations and recycling reports from facilities, utilizing a bottom-up calculation approach. However, this methodology often includes materials that may be contaminated, such as those affected by increased moisture, which in turn impacts weight estimates. Additionally, it is challenging to trace the introduction of material into the system and determine whether it originated within the state. Ideally, the calculation of generated tonnage would be based on sales data from producers who sell packaging within Washington, as these figures are more likely to reflect clean, dry, and geographically specific tonnages.

Limited sales data for reuse eligible products

- The estimates for sales data pertaining to reuse-eligible products derive from national figures because of the scarcity of product-level sales data specific to Washington State. Reliance on national data introduces a higher degree of uncertainty into estimating the advantages associated with reusable programs in Washington, due to the fact that the estimates are constructed on a less precise comprehension of local generation and consumption patterns.

Lack of existing reuse systems in Washington, as well as large-scale reuse in other jurisdictions

- The reuse system modeling employed a diverse range of sources, particularly from Europe. This is due to a lack of well-established reuse systems in Washington and the limited existence of large-scale reuse models in other US jurisdictions. To bolster precision of modeling reuse in future studies, any progress made on reuse in the Washington context or US context should be closely monitored for data to inform assumptions. This approach would ensure that assumptions more accurately reflect the local dynamics and regional circumstances.

Study limited to residential sector

- This study exclusively concentrated on the residential sector. Given that most data sources for locations outside Washington State do not differentiate between consumption in the residential and commercial sectors, the project team had to make additional assumptions about the potential distribution of products between these sectors. This introduces an additional layer of potential inaccuracy into the estimates.

Potential need for temporal analysis

- There is limited data on the progress and expansion of reuse systems over time. The modeling conducted in this study was for a specific point in time in Washington. This absence of temporal adjustments may not fully capture the dynamic reality of how reuse systems can evolve within a jurisdiction.

3.0 Community Input Process

3.1 Overview

Eunomia coordinated development of a two-pronged public outreach strategy for the community input process, involving a survey and a community engagement element. C+C led the survey work, MFA led the community engagement, and Start Consulting advised on how to deploy strategies to embed environmental justice, diversity, equity, and inclusion into the overall community input process.

The purpose of this work was to understand the key challenges residents are facing regarding recycling, reuse, and minimizing waste. These may relate to language barriers, limited transportation, challenges specific to multi-family residences, and many other factors. A better understanding of common challenges and points of frustration associated with recycling for Washingtonians is crucial to developing a future system that addresses those concerns. The outreach also aimed to elucidate how residents want to engage with changes to the Washington waste system in the future. Results from the survey and public engagement efforts were intended to provide a comprehensive picture of the public's outlook on recycling in the state.

The community input process focused on soliciting feedback from a representative sample of Washington respondents, including highly impacted and vulnerable populations. It was steered by the following objectives:

1. Conduct an equitable, inclusive, and transparent statewide community input process to elicit an understanding of public values, opinions, and experience regarding the recycling systems in Washington, and ways the public believes their recycling experience and system outcomes could be improved.

2. Understand Washington residents' thoughts and perceived barriers around reuse and source reduction.

The entire community input process was conceptualized, implemented, and evaluated within a 12-week period. In our team's experience, it takes eight to 12 months to carry out a fully accountable, transparent, culturally relevant, and holistically equitable community input process that reaches all communities and allows sufficient time for effective engagement planning, implementation, and reporting. The impacts of this, and other limitations, are discussed in more detail later in this section.

3.2 Survey

The project team conducted the survey between September 18, 2023 and October 9, 2023, in both English and Spanish, and received a total of 2,231 responses. The survey was designed to address the following key objectives:

- Gather information about respondents' current perceptions of recycling and their recycling service (or lack of one).
- Uncover barriers and motivators to recycling and using curbside recycling services (where applicable).
- Identify challenges and points of confusion and concern over the recycling process and system.
- Identify willingness to participate in a DRS program (referred to as a beverage container deposit program in the survey) as well as associated challenges and perceptions.
- Gather information about support for producer responsibility policies designed to reduce waste and improve recycling, with a focus on packaging.
- Identify differences among individuals in multi-family and single-family households, and among individuals with and without current curbside availability or subscriptions.

3.2.1 Methodology

The project team conducted the survey using a 10- to 12-minute online questionnaire developed by C+C in collaboration with Ecology, and with technical input from Eunomia and Start Consulting. The questionnaire, offered in English and Spanish, used closed-ended questions and Likert scales to measure attitudes and behaviors around recycling policies and practices. Participation was voluntary and any data collected was kept confidential by the research team.

Recruitment Approach

The survey was open to adults (18 and older) currently living in Washington in either single- or multi-family dwellings. To ensure feedback was captured from overburdened and/or vulnerable populations, as well as from households with varying levels of access to recycling, reuse, and waste prevention programs, the team prioritized recruitment of the following specific audiences:

- Spanish-speaking households
- Households with no recycling services available
- Individuals who identify as Black, Indigenous, People of Color (BIPOC)
- Households in Eastern Washington

Three different recruiting streams were utilized for this survey:

- The first stream involved partnering with panel providers to help achieve a representative sample in the State of Washington. This survey had a screener to ensure it targeted the correct blend of participants.

- The second recruitment stream was through a link available at in-person events conducted by MFA. This survey captured screening information but did not have a quota for respondents.

- The third recruitment stream involved working with Ecology's and county's partners to leverage any community relationships that already exist and align with the purpose of this research.

The survey questions themselves were the same for all surveys, but the survey links in these three recruiting streams were unique to allow correct identification of how participants were recruited.

Participants from the first recruiting stream were given 200-point (or $2.00) incentives as part of their agreement with the panel partner. Panelists accrue points to their account for any survey they complete; they can then exchange these points for cash or product awards. The first 875 participants from the second and third streams (in-person event and partner links) received $10 incentives for their time. Given that the number of participants from these recruiting streams was lower than 875, all participants received the incentive.

Language

The questionnaire was designed first in English and then translated into Spanish by C+C's multicultural team. The translation went beyond merely converting the language into Spanish to achieve *transcreation*, an approach that also takes into account cultural considerations around the way people talk about recycling and waste reduction.

Analysis

The project team carried out extensive data cleaning. Data were retained if respondents met the following criteria:

- Lived in Washington

- Were over the age of 18

- Lived in either a single- or multi-family dwelling

- Had an IP address inside Washington State

- Took the survey in over 5 minutes (i.e., were not "speeding")

- Did not provide unintelligible answers, or answers that either indicated they did not the survey seriously or called into question the validity of their responses.

Females were overrepresented, which is expected in survey research, so responses were weighted to match the true gender distribution of Washington State. No other weighting was deemed necessary, given the sample.

Limitations

Given the timing constraints of this project:

- The study was conducted via an online survey, which could be taken on a computer or mobile device. This research methodology allowed the team to conduct the data collection and analysis in the time allotted for the research project. However, it limited respondents to those with internet access and access to a mobile

device or computer, meaning that these results do not capture the opinions and beliefs of those without access to these resources.

- There was not enough time or funding to develop relationships with community-based partners for more focused survey recruiting efforts. For example, though individuals from Tribal nations were identified as a priority audience, there was not enough time to conduct culturally competent outreach, including building or leveraging existing relationships and engaging partners in a two-way conversation about survey development and recruitment. This meant that our recruiting plan had to be designed in a way that used panel partners and existing relationships.

- The team was unable to offer the survey in languages other than Spanish and English due to the time and funding needed for survey transcreation, as well as the lack of time to work with community organizations around the state to recruit individuals who speak other languages at home. This limited the sample to those who spoke English or Spanish at a level comfortable enough to take the survey, meaning the results do not capture the opinions and beliefs of people who do not speak those languages.

One potential limitation C+C expected was the inability to recruit specific numbers from some priority audience segments due to timing constraints. The recruitment, however, did reach or exceed the goal for most of the priority audiences. C+C was able to oversample (recruit more than the goal) for those without recycling service, BIPOC individuals, and those living in Eastern Washington. C+C achieved similar percentages to Washington's population (based on census) in terms of Spanish speakers.

3.2.2 Participant Demographics

The section provides the demographic breakdown for the 2,231 respondents. These data are self-reported by the participants. When possible, demographics at the state level for Washington are included in data tables in a separate column to easily compare survey respondent demographics and overall Washington demographics.

Detailed findings and the full survey are provided in Appendix A.2.0. All data are rounded to the nearest whole number, so percentages may not always add up to 100 percent. Tables 29 – 43 illustrate the demographics and access to recycling services.

Table 29: Residence Type

	Which of the following best describes your type of home? (n=2,231)
Single-family	66%
Multi-family	34%

Just under 70% of respondents in single-family homes own their home, while 26% rent. Forty percent of respondents in multi-family homes own their home, while 58% rent. About half (51%) of respondents live in Western Washington, while 35% live in Eastern Washington and 14% live in Central Washington.

Counties included in each region:

- **Western**: Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, King, Kitsap, Lewis, Mason, Pacific, Pierce, San Juan, Skagit, Skamania, Snohomish, Thurston, Wahkiakum, Whatcom

- **Central**: Chelan, Douglas, Grant, Kittitas, Klickitat, Okanogan, Yakima
- **Eastern**: Adams, Asotin, Benton, Columbia, Ferry, Franklin, Garfield, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman

Table 30: Unincorporated versus City

	Do you live in an unincorporated area? (n=2,231)	Washington State (from US Census Bureau)
Unincorporated	28%	34%
City/Town	55%	66%
Unsure	17%	-

Table 31: Race/Ethnicity

	Which of the following do you identify with? Select all that apply. (n=2,231)	Washington State (from US Census Bureau)
White	61%	65%
Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	14%	14%
BIPOC (NOT including Hispanic or Latino/Latina/Latinx)	22%	23%
Prefer not to respond	3%	-

Table 32: Language Survey Taken In

	Language survey taken in (n=2,231)	Washington State (from US Census Bureau)
English	91%	-
Spanish	9%	9%

Table 33: Age

	Which category includes your age? (n=2,231)	Washington State (from US Census Bureau)
18-24	9%	11%
25-34	25%	19%
35-44	24%	18%
45-54	13%	16%
55-64	11%	16%
65+	18%	20%

Table 34: Education

	What is the highest level of education you have received? (n=2,231)	Washington State (from US Census Bureau)*
Attended some high school or less	3%	8%
High school graduate	13%	22%
Completed some college	22%	21%
Graduate of a 2-year college	15%	10%
Graduate of a 4-year college	30%	24%
Trade/vocational school graduate	5%	-
Post-graduate degree	11%	16%
Prefer not to respond	1%	-

*Note: WA State Census education level information was not collected at the granular level of the C+C conducted survey.

Table 35: LGBTQ+ Identity

	Do you identify as LGBTQ+? (n=2,231)	Washington State (from Williams Institute[76])
Yes	13%	5%
No	82%	95%
Prefer not to respond	5%	-

Table 36: Gender

	What gender do you identify with? (n=2,231)	Washington State (from US Census Bureau)*
Female	61%	50%
Male	36%	50%
Non-binary	1%	-
Transgender	0%	<1%
Something else	0%	-
Prefer not to respond	1%	-

*Note: WA State Census gender information was not collected at the granular level of the C+C conducted survey.

Table 37: Income Level

	Which of the following best describes your total annual household income? (n=2,231)	Washington State (from US Census Bureau)
Less than $25,000	12%	13%
$25,000-$49,999	22%	16%
$50,000-$74,999	25%	16%
$75,000-$99,999	17%	13%
$100,000-$149,999	13%	19%
$150,000 or more	5%	22%
Prefer not to respond	5%	-

Table 38: Recycling Participation – Single-Family

	Do you currently have curbside recycling service (e g where recyclables are picked up at your home and brought to a recycling facility) for your household? (n=1,464)
Yes	68%
No	29%
Not sure	3%

Table 39: Recycling Service Subscription – Single-Family

	Do you currently pay for your recycling service? (n=998)
Yes	75%
No	18%
Not sure	7%

Table 40: Recycling Service Availability Among Those Not Using Curbside – Single-Family

	Is curbside recycling service available to your household, as in, could you subscribe to recycling service but you choose not to? (n= 418)
Yes, recycling service is available	22%
No, recycling service is not available	61%
I'm unsure if recycling service is available	18%

Table 41: Utilize Drop-Off Locations for Recycling Among Those Not Using Curbside – Single-Family

	Do you drop off your recycling at a recycling drop-off location or transfer station? (n=418)
Yes	77%
No	23%

Table 42: Recycling Availability – Multi-Family

	Does your building or complex provide a bin for recycling? (n=767)
Yes	71%
No	24%
Not sure	4%

Table 43: Utilize Drop-Off Locations for Recycling Among Those Where Building Does Not Provide – Multi-Family

	Do you drop off your recycling at a recycling drop-off location or transfer station? (n=219)
Yes	53%
No	47%

3.2.3 Key Insights

Several key learnings emerged from the survey of Washington residents, as discussed below and in the Detailed Findings section in the Appendix A.2.0.

- **Most Washington residents are strongly motivated to recycle**. More than three quarters (76%) rate recycling as "very important" or "important" to them personally. Importance is strong across geographic regions, ethnicities, residence types, and community types. Unsurprisingly, those who have current curbside/building recycling are more likely to find recycling important than those who do not currently participate. There are multiple strong motivators for those who recycle, with the strongest being the ethics and environmental impact of recycling:
    - It's the right thing to do (61%).
    - To keep recyclables out of landfills (60%).
    - To reduce pollution (55%).
    - To conserve natural resources (55%).
- **Washington residents support the value of recycling**. There is strong agreement with the principles of recycling in terms of importance and access (the percentages below represent combined "strongly agree" and "agree" responses):
    - Everyone in Washington should have access to convenient recycling options (86%).
    - Reducing waste is important (86%).
    - Everyone in Washington should be able to recycle the same items, regardless of where they live (82%).
    - Recycling should be free for everyone in Washington (78%).

  In general, these values receive consistently strong support across residence and community type, geographic region, ethnicity, and recycling status. However, those living in single-family homes do tend to support these values slightly more than those living in multi-family units. BIPOC residents (excluding Hispanic/Latino/Latina/Latinx) also support these values somewhat less than other ethnic groups do:
    - Everyone in Washington should have access to convenient recycling options (78% BIPOC versus 89% Hispanic/Latino versus 89% White).
    - Reducing waste is important (79% BIPOC versus 88% Hispanic/Latino versus 89% White).
    - Everyone in Washington should be able to recycle the same items, regardless of where they live (73% BIPOC versus 81% Hispanic/Latino versus 85% White).
    - Recycling should be free for everyone in Washington (70% BIPOC versus 83% Hispanic/Latino versus 82% White).
- **Washington residents willingly participate in recycling in the manner that is available to them**. Among single-family home residents:
    - 68% indicate they have curbside recycling pick-up currently (of which 75% pay for this service).

- Rural residents are much less likely to report that they currently have curbside recycling (31%) compared to Urban (78%) or Suburban (81%) respondents.
- Similarly, those in the Central part of the state are less likely than others to report current curbside recycling (27% versus 82% Western and 68% Eastern).
- Of those without curbside recycling currently, 77% indicated they recycle at a drop-off or transfer station. Among these residents, those living in Urban settings (62%) and those in Western Washington (66%) are less likely to utilize a drop-off or transfer station.

Among multi-family home residents:

- 71% indicate that their building currently provides a bin for recycling. Rural residents are less likely than others to report current building bin availability (47% versus 76% Urban and 72% Suburban).
- The Central region (51%) has the lowest rates of current multi-family bin availability, followed by the Eastern (66%) and Western regions (79%); Western Washington has the highest rate.
- Of those without building bin recycling, 53% indicated that they recycle at a drop-off or transfer station. Those in the Eastern part of the state have the lowest rate of drop-off (42%).

- **Many Washington residents have confidence in how they recycle, but fewer feel confident about what happens to their recyclables.** A majority of Washington residents who are participating in recycling (66%) are reasonably confident ("very confident" or "confident") that they are recycling items correctly. Recycling confidence is consistent across geographic regions, ethnicities, residence types, and community types. Those who currently participate in curbside/building recycling are more confident that they are recycling correctly than those who do not.

- **A majority of Washington residents who are participating in some form of recycling (via curbside, drop-off location, transfer station, or some other means) are reasonably confident ("very confident" or "confident") that they are recycling items correctly (66%).** Recycling confidence is generally consistent across geographic regions, ethnicities, residence types, and community types. Those who currently participate in curbside/in-building recycling are more confident that they are recycling correctly than those who do not participate by these routes (but may by a different one).

  Residents also have some doubts about what happens to materials they recycle. Only 38% are "very confident" or "confident" that items placed in bins are actually being recycled and made into new products.

- **Single-family residents who have curbside service have mixed feelings about it. Single-family residents generally view their service as consistent and convenient, but they are less likely to rate it as affordable and easy to understand.**
  - Among those single-family residents receiving curbside service, 56% rate it as "very consistent" and 31% as "somewhat consistent."
  - Similarly, 53% rate their curbside service as "very convenient" and 30% as "somewhat convenient."
  - In contrast, affordability is rated weakest: only 28% rate their curbside service as "very affordable" and 35% as "somewhat affordable."
  - In terms of ease of understanding, 37% rate their curbside service as "very easy to understand" and 39% as "somewhat easy to understand."

- **Multi-family residents do not feel as strongly about the consistency and convenience of current recycling as single-family residents, but they have similar views on cost and ease of understanding**.
    - Among multi-family residents with recycling at their buildings, only 32% rate their building recycling as "very consistent" and 43% as "somewhat consistent."
    - In terms of convenience, 36% rate their building recycling as "very convenient" and 34% as "somewhat convenient."
    - Only 28% rate their building recycling as "very affordable" and 36% as "somewhat affordable."
    - Additionally, 35% rate their building recycling as "very easy to understand" and 37% as "somewhat easy to understand."
- **While there is generally consistency in satisfaction ratings across important subsegments, there are a few notable differences**. For the most part, service satisfaction ratings remain consistent across segments, with a few notable differences.
    - Those living in single-family homes are more likely than those in multi-family homes to believe that their current service is consistent (87% versus 75%) and convenient (82% versus 70%).
    - Those in the Eastern region are more likely to agree that it is convenient (80%) than those in the Central region (66%).
    - BIPOC residents (excluding Hispanic/Latino/Latina/Latinx) are less likely to feel that the current service is convenient (66%) than those who are White (82%) or Hispanic or Latino/Latina/Latinx (84%).
- **Among those residents that do not currently have recycling service at their residence, the vast majority would engage in a free recycling program at their residence if it were available to them**. Among single-family residents who said "no" or "not sure" to participating in curbside recycling, 76% said they would participate if that program was free.
    - Central Washington residents are more likely to indicate that they would participate in curbside recycling were it available for free recycling (84% versus 66% Western and 76% Eastern).
    - BIPOC residents (excluding Hispanic/Latino/Latina/Latinx) are less likely to indicate that they would participate in curbside recycling were it available for free (62%) than residents of other ethnic groups (81% White and 84% Hispanic or Latino/Latina/Latinx).
    - Among multi-family residents who said "no" or "not sure" to their building having recycling, 73% said they would participate in a free program were it available to them. Segmentation differences were similar to those from single-family residences.
    - Central residents (80%) are more likely than Western (70%) or Eastern (72%) residents to indicate willingness to participate.
    - BIPOC residents (excluding Hispanic/Latino/Latina/Latinx) were less likely (64%) than White (76%) or Hispanic/Latino/Latina/Latinx (81%) to indicate they would participate.
- **Both single- and multi-family residents identify additional barriers to recycling, whether they have current recycling services or not.** Challenges to recycling at home are varied, with the most common being access, inconsistent standards about what can be put in the bin in different places, and recycling knowledge:
    - Cannot recycle certain items in my community (30%).

- What can and can't be recycled is different from place to place (27%).
- Unsure what can and can't be recycled (25%).

Challenges in recycling "on the go" mirror those at home, with concerns about access, consistent standards, and knowledge again heading the list:

- There aren't enough public recycling bins (48%).
- Recycling bins are not available when on the go (37%).
- What can and cannot be recycled is different from place to place (37%).
- I don't know where I can recycle when on the go (35%).

- **Residents strongly believe in EPR concepts**: There is considerable support for corporate responsibility around recycling ("strongly agree" and "agree"):
  - Companies should design product packaging that is easily recyclable (85%).
  - Companies should design product packaging using the least amount of material possible to help reduce waste (83%).
  - Companies should include recycled content in their packaging to ensure recyclables are made into new things (78%).
  - Companies should take responsibility for recycling the packaging that their products come in (72%).
  - Companies should pay for the recycling systems needed to allow for their packaging to be easily recycled (68%).

  This support varies somewhat across demographics:

  - Those in single-family homes were generally more likely to agree with these concepts than those in multi-family homes.
  - Those in rural areas were more likely than those in urban areas to agree that companies should design packaging that is easily recyclable (90% versus 81%) and that packaging should use the least amount of material possible (89% versus 78%).
  - Hispanic or Latino/Latina/Latinx residents are more likely than others to agree that companies should take responsibility for recycling their product packaging (81% versus 73% White and 69% BIPOC). They were also more likely than others to agree that companies should pay for the recycling systems necessary to allow their packaging to be easily recycled (80% versus 67% White and 65% BIPOC).
- **Residents indicate a strong likelihood to participate in the beverage container deposit program.** Residents indicate there would be high participation rates in the beverage container deposit program described in the survey, with 43% "very likely" and 27% "likely" to participate. Only 8% indicate that they would be "not at all likely" to participate.
  - Residents who live in rural communities (53% "very likely" and 21% "likely" for a combined 74% "likely to use" rate) indicate a slightly stronger rate of likely participation than those in urban areas (40% and 31% respectively for a combined 71%) or suburban areas (40% and 27% respectively for a combined 67%).
  - Residents who live in Eastern Washington (42% "very likely" and 27% "likely" for a combined 69% "likely to use" rate) indicate a similar rate of likely participation as those in Western Washington

(41% and 28% respectively for a combined 69%) or Central Washington (48% and 27% respectively for a combined 75%).

When asked to select their top two reasons (from a list provided) for participating in the described beverage container deposit program, respondents indicated support for a variety of potential motivators:

- To receive a 10-cent deposit back (42%)
- To reduce bottles/cans in landfills (34%).
- To make sure my bottles/cans are recycled (31%).
- Because recycling is important to me (30%).
- To reduce litter (25%).

When asked to select their top two reasons (from a list provided) for why they may not participate in the described beverage container recycling program, respondents tended to focus on convenience factors:

- It would be easier to just put them in my bin at home (35%).
- It would take too much time to take my bottles/cans to a deposit return center (33%).
- I don't have a place to store bottles/cans at home (25%).
- I don't have a way to transport bottles/cans to a deposit return center (20%).

When asked "How much, if at all, would paying the 10-cent deposit for bottles and cans impact you?"

- 22% of respondents indicated it would have a significant negative impact.
- 41% said the 10-cent deposit would have a slight negative impact.
- 37% said it would have no impact.

The rates of those indicating significant negative impact are fairly consistent across geographic regions, ethnicities, residence types, and community types. There is a slight difference in rates among respondents with varying access to and uses of curbside recycling. The 10-cent deposit is viewed as more negatively impactful by those who have declined curbside recycling use (34%) or those who are unsure of its availability (29%), compared to current participants (22%) or those without access (18%).

- **The bottle deposit process would need to be geographically convenient for residents to consistently participate**. The answers to the question "If this program were established in Washington, how far from your home would you be willing to travel to return containers to get your deposit refund?" showed a strong preference for convenience, with some variability by urban and rural.
  - Most (70%) would be willing to travel up to 5 miles to participate in a bottle deposit program.
  - Only 11% would travel more than 10 miles. Of these, more rural residents (28%) are willing to travel more than 10 miles (28%) than those in urban (6%) or suburban (7%) settings. More Central region residents (23%) are willing to travel more than 10 miles than those in Western (7%) or Eastern (11%) Washington.
  - The majority of urban residents (78%) would want a container refund site to be within 5 miles of their homes. Very few (6%) would be willing to travel more than 10 miles.
- **Some Washington residents would like to have additional information before they can determine whether they would support the beverage container deposit program.** When asked to identify any additional

information they would need to determine whether they would support the beverage container recycling program, some themes emerged and some residents expressed their feedback as concerns. Among the most commonly cited were:

- Concerns about cost to them.
- How convenient returning would be (in other words, the effort it would entail for them).
- What the specific parameters would be (e.g., what items would be included).
- What the impact of the program would be (e.g., will taxpayer money be used, how much it would improve current recycling measures).
- How will the public be educated/prepared for new program.
- Whether there are examples of successful similar programs elsewhere.

3.3 Direct Public Engagement

Qualitative, direct community engagement took place over a roughly five-week period between early September and early October 2023. This included in-person outreach conducted via interactive booths at community fairs and festivals and major grocers across Washington (see Figure 18). The input process was designed to solicit feedback that encompassed a diverse range of perspectives and experiences. Below is an overview of the methodology and findings from community engagement at these events.

The constraints of this approach include limited time to authentically engage these communities and fully understand the barriers that they face in the recycling system. This cannot be done without significant time and investment in relationship-building with communities that lack access.

This section provides an overview of the target audiences, engagement location selection, engagement format, and questions asked.

3.3.1 Targeted audiences and questions

To ensure comprehensive insights and meaningful participation, during the outreach planning phase, the project team identified key audiences for in-person participation, with an emphasis on historically underrepresented communities across Washington State. These communities often have limited access to recycling and reuse facilities. By engaging with residents and reaching out to those served by community-based organizations, we aimed to understand their unique challenges and perspectives to better inform the study. The types of communities that were actively recruited and engaged included:

- **Low-Income Communities:** Socioeconomic disparities can impact waste generation and recycling practices. Engaging with people who have low incomes is crucial to addressing equity concerns. By selecting community events that are free to attend, like hosting outreach booths at grocery stores in areas that generally skew towards lower incomes, we sought opportunities to gather perspectives to better inform outcomes that are accessible and beneficial for all residents, regardless of their economic status.

- **Communities of Color:** Communities of Color often bear a disproportionate burden of environmental impacts, including waste management challenges. By conducting outreach at ethnic/cultural community events, such as Pasco's Fiery Foods Festival, we sought to meet folks in their community spaces, better allowing us to understand their views, needs, and preferences.

- **Indigenous Communities:** Recognizing the unique relationships that Indigenous communities have with the environment, we set an intention to engage them through outreach at tribal events such as the Cowlitz Health Walk and the Roots Indigenous Art and Music Festival. Their traditional knowledge and lived experiences should be essential in informing waste management strategies that align with their values and respect their ancestral connections to the land.

- **Rural communities:** Rural communities are often overlooked in waste management discussions. By engaging with these communities, we aimed to better understand their waste disposal challenges, identify opportunities for recycling and reuse, and elevate potential solutions that align with the unique aspects of rural life. The outreach events in Aberdeen, Mount Vernon, Longview, Yakima, and Omak were visited by a significant number of people residing in rural communities.

- **Underrepresented communities:** Outreach events were also selected as a means of attracting diverse, intersectional audiences, such as the Grays Harbor Pride Festival. These audiences shared perspectives and lived experiences that contributed towards a more holistic summary of opinions.

Inclusivity, cultural sensitivity, and equity guided our outreach approach with these diverse audiences. We focused on creating a platform where every voice was heard and respected, fostering dialogue to help shape an informed and balanced study.

The following questions were asked of participants at the outreach events.

- Please describe your at-home recycling service. What do you like about your recycling system and what do you wish could be changed?

- Are you ever confused about what you can put in your recycling bin and why?

- How important do you think it is to recycle and why?

- How important do you think it is to reduce the amount of waste we produce as a society and why?

- Do you think consumer product companies should pay for recycling of their packaging? Or should residents and local governments pay? Why do you feel that way?

- When you recycle, where do you think the items are going?

- What do you think about Washington adopting a deposit return system, similar to Oregon?

- How would you like to get your food or beverage in a reusable or refillable container that, after you have used it, would be refilled by the business (rather than one-use disposable containers)?
- What else would you like to see happen in this state to improve recycling and reduce waste?

3.3.2 Outreach Events

In-person outreach was conducted via interactive booths at community events across the state, with at least one event conducted in each of the six regional areas of Washington shown in Figure 18. The list of outreach locations and number of participants is in Table 44. Events were selected based on timing during the outreach phase, availability to host an outreach booth, location in each region, and status of recycling service in that location, such as lack of curbside recycling pick-up, or pick-up that is limited in terms of the types of materials accepted. Additional preference was given to Tribal and cultural events as described above, and two events were conducted in the Central region based on direction from Ecology to conduct specific outreach in Yakima, due to the limited curbside services in that area. This strategy aligned with the project's objective to prioritize outreach to underserved communities by meeting them where they are and removing any barriers to participation arising from the time required to travel and attend a standalone public meeting or open house.

Figure 18: Outreach Event Locations

Table 44: Outreach Event Details

Washington regional area	Event	Date	Number of people engaged
Eastern Washington	Fiery Foods Festival (Pasco)	Sept. 9	~80
Southwest Washington	Cowlitz Health Walk (Longview)	Sept. 17	~70
Western Washington	Grays Harbor Pride Festival (Aberdeen)	Sept. 23	~100
Central Washington	Roots – Indigenous Art and Music Festival (Omak)	Sept. 23	~20
	Outreach booth at Yakima Wal-Mart (Yakima)	Sept. 27	~35
Northwest Washington	Skagit Bigfoot Fest (Mount Vernon)	Sept. 30	~70
Puget Sound	Outreach booth at Stadium Thriftway (Tacoma)	Oct. 6	~60

Format and layout. Outreach was conducted through staffing booths at local events in the six regions to engage event attendees through interactive games with prizes (see example in Figure 19). Outreach staff solicited participant opinions about recycling systems and gathered feedback about barriers to services and desired improvements. Outreach staff also directed eventgoers to take the online quantitative survey if they wished to provide more in-depth feedback or provide feedback later at a more convenient time. A total of 23 people from the live events took the survey.

Materials. Materials were created to provide background information to community members. This included a fact sheet that provided an overview of the Recycling, Reuse, and Source Reduction Target Study and Community Input Process, with an emphasis on asking for public input. It also included a QR code linking to the survey. The fact sheet was translated into Spanish to help address potential language barriers when engaging with communities. Outreach booths featured a large, eye-catching sign to catch the attention of eventgoers, as well as a spinner wheel game where participants would spin the wheel and, depending on where the wheel landed, a question was asked. Outreach staff then recorded the feedback received, which is summarized in this report. As shown in Figure 20, recycling-themed reusable bags, candy, and stickers were provided as rewards for answering questions on the spinner wheel game and to boost engagement. The booth also offered a comment box where participants could share their feedback in writing instead of verbally to staff. A total of 12 people chose to submit written comments.

Figure 19: Outreach Booth Setup

Figure 20: Fact Sheet, Reusable Bags, and Stickers featured at Outreach Booths

3.3.2.1 Findings Overview

After engaging with hundreds of residents across the state, from those in dense, urban settings in the Puget Sound to remote, rural communities on the Colville Reservation, some themes came into focus. These are listed here and elaborated on below.

- Strong care about recycling and belief in its importance.
- Confusion over what can and cannot be recycled and frustration with the lack of consistency in recycling services across municipalities.
- Belief that producers should be at least partially accountable for recycling their product's packaging.
- Desire for increased transparency about what actually gets recycled, what ends up in landfills, and where it all winds up.
- Desire for curbside recycling services (for those that do not have it), and for it to include more types of materials such as glass and plastic (for those that do).
- Openness to the idea of a deposit return system, with opportunities for input and more information.
- Enthusiasm for the ability to use reusable and refillable containers at stores.
- Desire for recycling services to be convenient, easy to understand, and affordable.
- Requests for additional educational resources for what is recyclable, so people can feel confident they are recycling correctly.

Importance of recycling and waste reduction as a society

The vast majority of people we spoke with value and see benefit in recycling. Many said they recycle because they see it as a way to reduce their environmental impact, lower the burden on landfills, and do their part to maintain the health of ecosystems. Most individuals want to see our recycling systems improved to make them easier, more convenient, and more straightforward to navigate. Reasons for the importance of recycling were primarily rooted in the pride residents take in their communities and the desire to protect our natural environments from litter and pollution. One person we spoke with in Longview, who identified as a Cowlitz tribal member, said his commitment to recycling and waste reduction is rooted in his Tribal heritage. Another shared that she was unaware she had so many opinions about recycling until we began asking questions. Most people that we spoke with expressed concern about the levels of waste humans are producing and their desire to help reduce the amount of waste that will end up as litter in their communities and in landfills, wildlife habitats, and oceans. One person we spoke with in Aberdeen told us, "Recycling is important. I have children that are going to have children. We need to reduce consumption for future generations."

We noticed that attitudes surrounding recycling were often correlated with the level of service in that particular area. For example, many people we spoke with in Yakima expressed a lack of enthusiasm for recycling in general, along with frustration that there are few to no services available. Several people noted that Yakima does not place a high emphasis on recycling compared to other parts of the state, such as Seattle, or other states like Oregon and California. Citing the lack of available curbside services and minimal emphasis on recycling in general, we heard that many people there recycle very few items or none at all. The items people reported recycling the most were cardboard and aluminum cans.

"Recycling is important. I have children that are going to have children. We need to reduce consumption for future generations."

- Aberdeen resident

Confusion over what can be recycled

Confusion surrounding recycling protocols was a consistent theme we heard across communities. This appears to stem from a lack of standardization in recycling acceptance lists across different municipalities, leading to a fragmented understanding of what can and cannot be recycled. Exacerbating this issue are the absence of standardized, concise, and locally relevant labeling, especially for plastic, glass, and milk cartons, and the lack of clear public education. As one Omak resident told us, "Lots of things that say they are recyclable actually are not. So, we need more of an honest labeling system."

> ***"Lots of things that say they are recyclable actually are not. So, we need more of an honest labeling system."***
>
> ***- Omak resident***

Many residents in Mount Vernon and Tacoma also reported their recycling service as having "ever changing standards," which makes decisions on what to put in the recycling bin and what to put in the trash bin a moving target. Consequently, individuals we spoke with reported finding themselves grappling with a frustrating dilemma: they are uncertain about whether materials are destined for recycling facilities or landfills, which leaves some feeling a sense of futility about taking the time to recycle. When asked about their recycling practices, one person in Yakima told us, "I'm over it all, I don't really care; where we live there are many times when the recycling centers are down, so when you take it to there then it all just goes to the trash anyways." Addressing the disparity in recycling practices through improved consistency across the state, combined with clear, consistent public education on what is recyclable and where materials wind up, were resounding recommendations for improvement.

Responsibility for paying for recycling of packaging

> ***"We should hold companies more accountable for the waste they produce."***
>
> ***- Longview resident***

Most individuals we spoke to responded favorably to the concept of holding producers at least partially financially accountable for recycling their product's packaging. Many view it as a progressive and fair approach to addressing the mounting environmental challenges posed by packaging waste. Community members see it as a means to shift the responsibility more equitably to producers who manufacture and profit from products. They believe it would serve as a stronger motivator to increase the use of recyclable packaging and reduce the use of non-recyclable plastics. One person we spoke with in Longview stated, "We should hold companies more accountable for the waste they produce."

However, there is a contingent that anticipates potential resistance from industries and worries that any increased costs to businesses from such policies would surely be passed onto consumers in the end. A few noted that the costs of recycling should be borne by governments and consumers, as they can choose whether or not to buy the products, with one person in Yakima stating, "The burden for recycling should be on the people themselves. We have the choice on what we buy and what we support," while others cited an imbalance of power between producers and consumers. One Aberdeen resident told us, "It should start with the manufacturers. As consumers, we don't have any say in what packages come in."

Perceptions of recycling outcomes and trust in the system

Across our outreach events, we encountered an array of perceptions regarding recycling outcomes and trust in the system. Most people with whom we engaged expressed confidence in their recycling systems, viewing them as important pillars of sustainable waste management. People we spoke to largely share a commitment to recycling and believe in its potential to mitigate environmental impact. They appreciate the positive effects of diverting waste from landfills, conserving resources, and reducing pollution. They believe their recycling efforts contribute to a collective, positive impact on the environment.

However, several people we spoke to expressed skepticism about whether or not recycled materials were repurposed as new products. Doubts stem from concerns about the efficacy of recycling facilities and what happens when recyclables are contaminated with food waste and from uncertainties surrounding the actual reuse or repurposing of collected materials. This skepticism is further compounded by reports of global recycling challenges, including issues with international markets for recycled material and instances where recyclables end up in landfills. Several people we spoke with believe that most things end up in the trash, even if placed in a recycle bin. Others believe that if something in the bin is not recyclable, it all winds up in the trash. This was reiterated several times by people from various locations. Most people expressed a desire for increased awareness and education about the overall recycling process, more clarity about the types of materials that can be recycled and what happens to items when they are recycled, and general transparency about the recycling system.

"People would recycle more if they knew where it was going."

- Omak resident

A smaller subset of people reported lacking trust in the government and were skeptical that recycling efforts translate into meaningful change. They expressed similar views about the need for increased transparency and clearer communication about recycling processes, along with more visible efforts to demonstrate the tangible benefits of recycling programs as a way to rebuild trust in the community that recycling is worthwhile. An Omak resident told us, "People would recycle more if they knew where it was going."

Favored aspects and desired changes to existing recycling systems

The people we spoke to across the state have various opinions regarding their favorite aspects of the recycling system and desired changes. Unsurprisingly, these opinions largely align with the current level of recycling service to which they have access. Those with more robust curbside recycling service appreciate the accessibility and convenience of it, with many saying it fosters a culture of environmental responsibility by lowering the individual's perceived amount of trash they produce that is destined for the landfill.

Those who have pick-up service for select materials also gave feedback about what improvements they would like to see; this feedback was consistent across all our outreach locations with pick-up service. Most notable is the desire for more types of material to be picked up, particularly glass and plastic.

"Many [people] living in apartments don't have recycling bins, or if they do have them, they're too small and quickly fill up, sometimes with trash."

- Aberdeen resident

Another notable feedback theme was associated with housing type. For example, one person in Aberdeen told us, "Many living in apartments don't have recycling bins, or if they do have them, they're too small and quickly fill up, sometimes with trash." In Yakima, one of the most frequently named barriers to recycling was cost, with one person telling us, "There is a recycling service, but the bins are too large and it's too costly for a small household. I have very little things to recycle. It comes down to cost for me. I wish the service would be free and have options. I would like a bin that fits my needs in order for it to be worth the cost." While most people we spoke with would like to have curbside recycling, many were worried there would be an additional cost.

The other frequently cited barrier was related to convenience and access to recycling services. Those living in communities with minimal or no curbside pick-up expressed a desire to have access to this. Those who lack curbside pick-up reported having to collect and then drop off their items at one of a few recycling facilities in the area. People named space limitations, no car access, or limited facility hours all as barriers that prevent them from recycling as

much as they would like to, if at all. Some residents in Omak told us that the Omak community and Colville Reservation have high poverty rates and that the cost of gas is another barrier to dropping off materials at recycling centers. Some we spoke to, who live in more rural areas, shared that many drop-off locations have closed recently due to misuse and illegal dumping of materials at these sites, forcing them to drive even farther to other drop-off sites. A few Longview residents shared that they would like to have either curbside pick-up or additional drop-off sites in convenient locations.

Although not specifically recycling-related, we received additional feedback from people living in the Tri-Cities that they would like to see compost/yard waste pick-up service offered as well. Community members in Omak also communicated the desire for an easier way to recycle larger items like old cars and large compostable items such as felled trees and heavy vegetation that are left behind from forest fires.

Opinions on deposit return systems

Opinions on deposit return systems varied across the seven community events attended. The majority view these systems positively, seeing the benefits of reduced litter and increased recycling rates. Many expressed excitement over a DRS, seeing the return of a deposit as a tangible reward for responsible disposal of beverage containers, which, in turn, encourages participation in recycling efforts. One person in Pasco told us, "I am really surprised Washington hasn't done this already." Many others thought a DRS would result in less litter in their communities, with one person in Aberdeen telling us, "We would see a lot less litter, since the houseless population would likely be dedicated to collecting and returning bottles."

Many in Yakima were in favor of a bottle deposit system, but they also expressed concerns about drop-off site maintenance, in terms of both cleanliness and security. A few people noted they have physical limitations (such as disabilities or ailments) that would make it difficult to take part in these systems, while others noted that if the system were designed to be accessible and convenient, they would consider using it.

While few people were opposed to deposit return systems, many questioned its feasibility in their communities and had questions about systems' logistics, transparency, and the potential for additional expense to the consumer. One person in Longview wondered, "I'm curious about where the bottle is going and who would be getting the money. If you don't return the bottle, where is the 10 cents going?" Others had concerns over who would actually participate in a DRS. One person in Mount Vernon stated, "It sounds good on paper, but the only people who would participate are poor folks because they need the money. Rich people need to do their part, instead of just littering." Some residents also shared that cost was an additional concern that may prohibit them from participating in a DRS. One in Pasco told us, "I do not want to see the deposit system in Washington. If you're paying taxes on other goods, such as soda, I don't want an additional fee on top of that."

Many we spoke with across central Washington had concerns about the convenience and accessibility of drop-off locations, especially in rural areas. One in Omak said, "If it means that people would recycle more, then yes. But it depends how rural it is and how far people need to go. I think people would if it were on the street or near the grocery store."

> ***"If it means that people would recycle more, then yes, [I would support a DRS in Washington]. But it depends how rural it is and how far people need to go."***
>
> ***- Omak resident***

Opinions on reusable/refillable container policies

Across our engagements, we heard a notable enthusiasm for the ability to use reusable and refillable containers at stores. Many view this idea as an easy, positive step towards reducing waste, especially single-use plastics. Residents

appreciate the opportunity to use their own containers for items like bulk foods, beverages, and cleaning supplies; they expressed a sense of pride associated with this kind of environmental contribution. Some even told us the stores where they shop allow this practice currently or used to allow it before the COVID-19 pandemic. One person in Aberdeen shared, "I would love that type of program – any type of program that encourages recycling." However, some offered opinions and hesitations about implementing such systems. Community members with reservations expressed concerns over the cleanliness of using reusable containers in public that people bring from home, particularly in light of shifting perspectives on public health brought on by the pandemic.

Ideas to improve recycling and reduce waste statewide

A prominent theme was a call for greater standardization of recycling guidelines across municipalities, especially among neighboring communities. The current lack of uniformity leads to confusion and frustration among residents, prompting a widespread desire for clear, consistent recycling protocols. One person in Longview told us, "Recycling should be the same across the state, have the same bins so there is consistency."

"Recycling should be the same across the state, have the same bins so there is consistency."

- Longview resident

Another person in Pasco said, "Washington should pass a law so that every municipality needs to recycle, but the state needs to help support and fund this so that people don't have to pay extra for the service." Other community members we spoke with held strong feelings about mandatory recycling policies, with a clear preference towards individual autonomy and empowerment. As one person in Yakima stated, "Don't make people recycle, but give them the means to recycle."

Additionally, there is a notable wish for increased transparency in the recycling process, with a desire for more visible, tangible outcomes of recycling efforts. When asked the question "when you recycle, where do you think those materials end up?" people expressed a keen interest in knowing what happens to their recyclables after they are collected. One resident of Longview told us, "I question what actually happens to it when it gets picked up and wish there was more transparency." Another in Omak responded, "A lot of what gets recycled actually goes to the landfill. It's hard to know the truth." Information about the lifecycle of recycled materials would boost community members' confidence in the system, as they would have confirmation that their actions were having an impact.

Finally, we heard a wish for greater emphasis on reducing single-use plastics and incentivizing the use of sustainable packaging alternatives, reflecting values of sustainability and environmental conservation. One person in Pasco stated, "I would like to see paper and cardboard used more instead of plastic."

3.3.2.2 Findings by Outreach Event Location

The following table provides a high-level summary of the feedback gathered at each outreach event, organized by topic and location. The purpose of this is to compare participant feedback by location to generate a more nuanced understanding. The opinions expressed represent those of the event attendees, not the municipality as a whole.

Table 45: Summarized Feedback by Outreach Event

	Outreach event location	Pasco	Longview	Aberdeen	Omak	Yakima	Mount Vernon	Tacoma
Location and background information Summary of sentiments on specific topics	**Washington regional area**	Eastern Washington	Southwest Washington	Western Washington	Central Washington	Central Washington	Northwest Washington	Puget Sound
	Number of people engaged at event	~80	~70	~100	~20	~35	~70	~60
	Population size*	77,108	37,818	17,013	4,860	96,968	35,219	219,346
	Median income*	$76,499	$53,044	$43,836	$49,063	$52,821	$62,706	$80,784
	Current recycling service notes	No curbside pick-up	Curbside pick-up available but limited in what's accepted	Curbside pick-up available but not for glass	No curbside pick-up	Those within city limits can subscribe to curbside pick-up for an extra cost	Curbside recycling is universally available in Mount Vernon for single-family residents, limited (optional) for multi-family residents. Those outside of city limits can subscribe to curbside pick-up for an extra cost	Curbside pick-up available but no longer accepts glass
	Confusion over what can be recycled	Confusion over plastic	Confusion over food packaging,	Confusion over plastic and	Confusion over what's	Confusion over what can be	Confusion over plastics,	Confusion over plastics,

	Outreach event location	Pasco	Longview	Aberdeen	Omak	Yakima	Mount Vernon	Tacoma
			plastics, where and how to recycle	packaging but otherwise confident	accepted at different drop-off locations	recycled where, especially plastics and bottles	bottles, and Styrofoam, changing standards of what's allowed	labeling, bottle caps, packaging materials
Summary of sentiments on specific topics	**Importance of recycling and waste reduction as a society**	Most believe recycling is important	Most believe recycling is important	Most believe recycling is important	Most believe recycling is important	Mixed sentiments – many feel recycling is important; others are apathetic	Most believe recycling is important	Most believe recycling is important
	Responsibility for paying for recycling of packaging	Most believe government and consumers should be responsible	Most believe producers should be responsible	Most believe producers should be responsible	Most believe producers should be responsible	Most believe government and consumers should be responsible	Most believe producers should be responsible	Most believe producers should be responsible
	Perceptions of recycling outcomes and trust in the system	Most believe items are recycled	Many believe some recycled materials end up in the landfill	Most believe items are recycled	Mixed sentiments about trusting that materials actually get recycled	Mixed sentiments about trusting that materials actually get recycled	Mixed sentiments about trusting that materials actually get recycled	Mixed sentiments about trusting that materials actually get recycled
	Favored aspects and desired changes to existing recycling systems	Curbside pick-up availability and what's accepted varies widely in the area. Want more consistency. Want glass to be picked up as well as compost/ yard waste	Those with curbside pick-up appreciate having it, but want glass and plastic added. Those without curbside want it or want more convenient drop-off locations	Appreciate having curbside pick-up, want more materials to be accepted, like glass. Apartment dwellers want more options	Want curbside pick-up. Want recycling to be easier, less financially burdensome and less time consuming, reduced use of single-use plastics	Want curbside pick-up, more drop-off locations that accept more types of materials, want pick-up to be free/low cost	Those with curbside pick-up appreciate having it but would like more types of materials added. Apartment dwellers want more options	Want glass accepted at curbside pick-up

	Outreach event location	Pasco	Longview	Aberdeen	Omak	Yakima	Mount Vernon	Tacoma
Summary of sentiments on specific topics	**Opinions on deposit return systems**	Generally favorable	Generally favorable	Generally favorable	Generally favorable	Mixed sentiments	Generally favorable	Generally favorable
	Opinions on reusable/ refillable container policies	Mixed sentiments	Generally favorable	Generally favorable	Generally favorable	Mixed sentiments	Generally favorable	Generally favorable
	Ideas to improve recycling and reduce waste statewide	Improved consistency between neighboring communities, increased education and transparency about recycling process and outcomes	Improved consistency between neighboring communities, increased education and transparency about recycling process and outcomes	Increased education about what can be recycled	Increased education on the importance of recycling and anti-litter, improved labeling on containers	Increased education on the importance of recycling, improved statewide policies for consistency of recycling services, more emphasis on anti-litter	Increased availability of at-home recycling pick-up, increased emphasis on anti-litter campaigns	Increased regulation on single-use plastics, increased education about recycling in schools, transparency of recycling outcomes

*US Census Bureau; American Community Survey, 2020 Decennial Census

*US Census Bureau; American Community Survey, 2022 American Community Survey 1-Year Estimates

3.3.3 Listening Session

To supplement the in-person outreach events, MFA planned a virtual listening session as a facilitated, interactive forum where an even mix of Washington residents across the state could share their thoughts, opinions, and ideas about recycling. The original intent was to hold these in person in multiple areas around the state, but due to timing and funding, an all-virtual session was the only viable option. This was intended as another way to allow more people to provide feedback than could attend an in-person outreach event and to help reach underserved populations. The session was publicized by emailing the opportunity to a list of community-based organizations across the state to share with their followers. These organizations do not have a recycling focus. The publicity also advertised compensation in the form of a $50 Visa gift card to encourage participation and enhance procedural equity by paying people for their time.

MFA hosted the 90-minute listening session on the evening of Tuesday, October 3, 2023, to:

- **Understand** the barriers community members face in accessing recycling services and evaluate public confusion regarding recycling practices.
- **Solicit feedback** on potential recycling programs and service improvements, including deposit return system scenarios.
- **Hear perspectives and insights** on operationalization and logistics to inform the community engagement final report.

More than 200 people expressed interest in participating in the session and self-reported living in Washington State. Their names were grouped by state region and 30 people were randomly selected so that the group collectively represented Washington State geographically. While 30 people were invited and accepted the invitation, a total of 24 individuals attended the session.

Two breakout rooms were used to maximize participation and give participants the opportunity to provide input through a variety of means. Conversation in the breakout rooms was led by facilitators. The team used online platforms Mural and Mentimeter as virtual feedback tools during the listening session. Materials included the email invitation, which included some background and context on the topic, as well as what to expect at the session and the types of questions that would be asked.

Outcomes and limitations. While feedback was gathered during the session, it has not been incorporated into this report because it was found to be unreliable. The project team determined that they could not adequately verify participants' eligibility, specifically their locations. For example, some participants used virtual private networks (VPNs), which make it impossible to identify location, and others had IP addresses that were outside the United States. Following the conclusion of the listening session, participants were asked to share their Washington mailing addresses. Only one provided this information.

There were 10 interested parties who MFA believed live in Washington State and who did not participate in the listening session. MFA reached out to these individuals and offered to speak with them individually to discuss their sentiments and feedback regarding recycling in Washington State. Compensation was again offered in the form of a $50 Visa gift card. One community member participated in a one-on-one conversation, and their feedback has been incorporated into the findings summarized above.

Lessons learned. To reach a broader cross-section of people living in Washington, especially groups that have not been historically included in recycling systems, we recommend instituting the following practices to help ensure valid participation in the future.

- Hold multiple in-person sessions across the state to effectively engage the intended audiences and provide engagement options for those who experience barriers due to the digital divide (the gap between those who have access to computers and internet and those who do not). This will take considerably more time for planning, publicizing, recruitment, and implementation than was allowed in this effort.

- Request that participants provide mailing addresses and phone numbers when registering to allow for follow-up and additional vetting, if needed and relevant to the individual participant.

- Allow more time for public engagement. This is especially important for authentic relationship-building with community-based organizations (CBOs) to support authentic engagement with groups that lack ready access to recycling systems. This may include culturally specific outreach with highly impacted and vulnerable populations.

- Work with CBOs to directly engage their community/client base, as opposed to promoting the event broadly through mass listserv emails or posting on social media, which may result in the registration link being shared well beyond the intended sphere of recipients.

- Review registration data thoroughly prior to selecting participants, with an eye towards suspicious patterns such as foreign IP address locations and multiple consecutive applications from the same IP address.

3.4 Limitations

A challenge for this study was the very short timeframe for thoughtful engagement with underserved and underrepresented communities. Relationship-building is key to engaging many frontline and/or overburdened communities. In our team's experience, it takes eight to 12 months to carry out a fully accountable, transparent, culturally relevant, and holistically equitable community input process that reaches all communities and allows sufficient time for effective engagement planning, implementation, and reporting. The following section complements the technical constraints and limitations discussed in prior sections of the community input process and outlines additional issues associated with equity, access, and representation. It also provides recommendations to improve future community input studies in Washington.

Equity and Access Limitations

Engagement strategies for reaching people about the importance of recycling and how to do it have remained much the same for decades. Outreach and engagement practitioners face certain challenges, including the lack of uniform resources and services in communities. We continue to see recycling rates fall short of target levels, despite the investment in and discussion around outreach. In other words, even people with full access to recycling systems and information struggle to understand recycling systems and recycle properly.

On top of engagement and outreach systems that already struggle or keep systems static, the state government has made more concerted efforts to reach people in frontline/overburdened communities who have been traditionally excluded from recycling systems, whether in communities of color, low-income communities, or rural communities. For example, the first statewide law to create a coordinated and inclusive approach to environmental justice, the Healthy Environment for All (HEAL) Act, was passed by the Washington State Legislature in 2021[77]; it establishes

programs to reduce pollution and health disparities in communities most at risk. Many people who identify as members of these communities face barriers to service, and recycling systems may fall below other priorities, such as their needs for food, shelter, healthcare, and childcare.

One nuance that was challenging to communicate in study engagement, but critical to improving recycling, reuse, and waste prevention systems, is that access to recycling is not the same as recycling accessibility.

Some examples of recycling access versus recycling accessibility are listed below:

- A person with disability or physical limitations, who may have recycling service at their single-family home but is unable to take their recycling cart to the curb for collection.
- A multi-family property that provides recycling service to their residents, but with only one collection container that is often overfilled, with no room for additional materials, or is placed in an inconvenient location for residents to easily access.
- A recent immigrant or refugee to Washington, who may have recycling systems available but, due to a lack of English language comprehension, does not understand the recycling system options or information provided.
- In a rural community that may provide recycling depots where home collection is not a viable option, people may have transportation challenges or lack funds to pay for extra fuel to take recyclable items to a depot.

In an ideal scenario, engagement with communities would include learning about the barriers that make recycling programs inaccessible to them. Meaningful and authentic engagement that will build relationships to elicit this type of information typically takes about one year.

Representation

While the survey portion of the study aimed to represent the demographics of the state, the low number of BIPOC represented in Washington should not translate into the amount of effort needed to reach those and other excluded communities. Other communities that should participate in the surveys and other engagement opportunities include people with disabilities, rural community members, aging populations, or other groups that have not been given access to recycling systems or experience recycling accessibility. Going forward with engagement beyond this study, considerations for representation should include:

- Recognizing that BIPOC and rural populations have generally received lower levels of outreach specific to recycling and that additional engagement and effort are needed to fully understand their needs.

- Understanding the potential for lack of trust in government entities and that relationship-building and engagement are needed to authentically engage with these audiences.

- Identifying the different cultural perspectives (whether immigrant or geographic) that may not value recycling, while still honoring existing sustainable and waste reduction practices.

- Casting a wider net of engagement and outreach to capture quality input from BIPOC and other frontline communities.

- Investing time, budget, and resources to build trust and relationship to authentically reach BIPOC, rural, and other people who have not historically had opportunities to participate or had access to services.

- Understanding the nuances and differences in engaging rural geographic areas and how their needs may differ from other populations.

Limitations to Learning: Going Forward with Equitable Engagement

Given the condensed engagement period, key issues like nuances in cultural differences and accessibility versus access could not be addressed. To see a real increase in Washington's recycling, reuse, and source reduction rates, Ecology should:

- Invest in local champions, which means working with people who identify with or represent specific communities that need to be reached.
- Build relationships and have clear communication with specific populations and CBOs, especially frontline communities.
- Work with Tribal nations to identify and understand Ecology's role in advancing recycling, reuse, and waste prevention and have a clear plan to authentically empower, engage, and support these nations.
- Identify and provide specific engagement with Indigenous populations not living in Tribal nations or reservations.
- Direct time, budget, and staffing to providing culturally relevant and specific outreach and communication; this should include translation, transcreation, interpretation, and language-specific engagement.
- Include enough time for thoughtful and relevant engagement to reach as many people as possible throughout the state, so their opinions and experiences fully inform future policy.

Limitations Summary

While the engagement process had limitations, the reach accomplished in a 12-week period, from planning to implementation by the C+C and MFA teams, shows that a thoughtful and intentional approach can reach a broad cross-section of people. The limitations of the existing recycling system and its current availability to people across Washington presented an additional challenge to the teams. As Washington works to create a better recycling system for residents, building on this work and expanding the timeline and budget for equitably engaging people throughout the state can help create a strong recycling system.

Appendix

A.1.0 Target Research and Model Calculations

A.1.1 Recycling, Reuse, and Source Reduction Targets in Other Jurisdictions

Recycling, reuse, and source reduction targets in other jurisdictions are shown in Tables 46-48.

Table 46: Recycling Targets

Jurisdiction	Material	Products	Target Rate	Target Date	Progress towards target
British Columbia[78,79]	All	Beverage containers	75%	"Within a reasonable time"	80.3% (2021)
British Columbia	All	Packaging	75%	"Within a reasonable time"	86.0% (2021)
California[80,81]	Plastic	Packaging	30%	2028	41.0% (2020)
California	Plastic	Packaging	40%	2030	41.0% (2020)
California	Plastic	Packaging	65%	2032	41.0% (2020)
EU[82,83]	All	Packaging	65%	2025	64.0% (2020)
EU	All	Packaging	70%	2030	64.0% (2020)
EU	Aluminum	Packaging	50%	2025	75.7% (2020)
EU	Aluminum	Packaging	60%	2030	75.7% (2020)
EU	Ferrous metals	Packaging	70%	2025	75.7% (2020)
EU	Ferrous metals	Packaging	80%	2030	75.7% (2020)

Jurisdiction	Material	Products	Target Rate	Target Date	Progress towards target
EU	Glass	Packaging	70%	2025	75.9% (2020)
EU	Glass	Packaging	75%	2030	75.9% (2020)
EU	Paper and carboard	Packaging	75%	2025	81.5% (2020)
EU	Paper and carboard	Packaging	85%	2030	81.5% (2020)
EU	Plastic	Packaging	50%	2025	37.6% (2020)
EU	Plastic	Packaging	55%	2030	37.6% (2020)
France[84,85,86]	All	Packaging	75%	2022	72.0% (2021)
France	Plastic	Beverage containers	77%	2025	59.0% (2021)
France	Plastic	Beverage containers	90%	2029	59.0% (2021)
Ontario[87,88,89]	Glass	Packaging	75%	2026	77.1% (2022)
Ontario	Glass	Packaging	85%	2030	77.1% (2022)
Ontario	Metal	Packaging	67%	2026	60.7% (2022)
Ontario	Metal	Packaging	75%	2030	60.7% (2022)
Ontario	Metal, glass, paper, rigid plastic, or combination	Beverage containers	75%	2026	81.0% (2022)

Jurisdiction	Material	Products	Target Rate	Target Date	Progress towards target
Ontario	Metal, glass, paper, rigid plastic, or combination	Beverage containers	80%	2030	81.0% (2022)
Ontario	Paper	Packaging	80%	2026	67.6% (2022)
Ontario	Paper	Packaging	85%	2030	67.6% (2022)
Ontario	Plastic	Flexible packaging	25%	2026	9.1% (2022)
Ontario	Plastic	Flexible packaging	40%	2030	9.1% (2022)
Ontario	Plastic	Rigid packaging	50%	2026	38.9% (2022)
Ontario	Plastic	Rigid packaging	60%	2030	38.9% (2022)
Oregon[90,91]	Plastic	Packaging	50%	2040	13.7% (2022)
Oregon	Plastic	Packaging	70%	2050	13.7% (2022)
Oregon	Plastic	Packaging	25%	2028	13.7% (2022)
Quebec[92,93]	Aluminum	Packaging	55%	2027	54.0% (2021)
Quebec	Aluminum	Packaging	80%	2052	54.0% (2021)
Quebec	Cardboard	Packaging	85%	2027	71.0% (2021)
Quebec	Cardboard	Packaging	90%	2032	71.0% (2021)
Quebec	Glass	Packaging	70%	2027	23.0% (2021)

Jurisdiction	Material	Products	Target Rate	Target Date	Progress towards target
Quebec	Glass	Packaging	85%	2042	23.0% (2021)
Quebec	HDPE	Rigid packaging	80%	2027	n/a
Quebec	HDPE	Rigid packaging	90%	2037	n/a
Quebec	Metals (except aluminum)	Packaging	75%	2027	48.0% (2021)
Quebec	Metals (except aluminum)	Packaging	90%	2042	48.0% (2021)
Quebec	Other plastics	Rigid packaging	75%	2027	n/a
Quebec	Other plastics	Rigid packaging	85%	2037	n/a
Quebec	Paper	Packaging	80%	2027	71.0% (2021)
Quebec	Paper	Packaging	85%	2032	71.0% (2021)
Quebec	PET	Rigid packaging	80%	2027	n/a
Quebec	PET	Rigid packaging	90%	2037	n/a
Quebec	Plastic	Flexible packaging	50%	2027	n/a
Quebec	Plastic	Flexible packaging	85%	2062	n/a

Table 47: Reuse Targets

Jurisdiction	Material	Packaging	Target	Target Date
Austria[94]	All	Beverage containers	25%	2025
Austria	All	Beverage containers	30%	2030
California[95]	Plastic	Packaging	2%	2027
California	Plastic	Packaging	4%	2030
California	Plastic	Packaging	10%	2032
Chile[96]	All	Beverage containers	30%	2024
Chile	All	On-site dining service ware	100%	2024
EU[97]	All	Alcoholic beverages in the form of wine, except for sparkling wine	5%	2030
EU	All	Alcoholic beverages in the form of wine, except for sparkling wine	15%	2040
EU	All	Alcoholic beverages in the form of beer, carbonated alcoholic beverages, fermented beverages other than wine, aromatized wine products and fruit wine, products based on spirit drinks, wine, or other fermented beverages mixed with beverages, soda, cider, or juice	10%	2030
EU	All	Alcoholic beverages in the form of beer, carbonated alcoholic beverages, fermented beverages other than wine, aromatized wine products and fruit wine, products based	25%	2040

Jurisdiction	Material	Packaging	Target	Target Date
		on spirit drinks, wine, or other fermented beverages mixed with beverages, soda, cider, or juice		
EU	All	Beverage container for takeaway	20%	2030
EU	All	Beverage container for takeaway	80%	2040
EU	All	E-commerce transport packaging for the transport and delivery of non-food items	10%	2030
EU	All	E-commerce transport packaging for the transport and delivery of non-food items	50%	2040
EU	All	Grouped packaging in the form of boxes, excluding cardboard	10%	2030
EU	All	Grouped packaging in the form of boxes, excluding cardboard	25%	2040
EU	All	Non-alcoholic beverages in the form of water, water with added sugar, water with other sweetening matter, flavored water, soft drinks, soda lemonade, iced tea, and similar beverages which are immediately ready to drink, pure juice, juice or must of fruits or vegetables, and smoothies without milk and non-alcoholic beverages containing milk fat	10%	2030
EU	All	Non-alcoholic beverages in the form of water, water with added sugar, water with other sweetening matter, flavored water, soft drinks, soda lemonade, iced tea and similar beverages which are immediately ready	25%	2040

Jurisdiction	Material	Packaging	Target	Target Date
		to drink, pure juice, juice or must of fruits or vegetables, and smoothies without milk and non-alcoholic beverages containing milk fat		
EU	All	Packaging takeaway ready-prepared food, intended for immediate consumption	10%	2030
EU	All	Packaging takeaway ready-prepared food, intended for immediate consumption	40%	2040
EU	All	Pallet wrappings and straps for stabilization and protection of products put on pallets during transport	10%	2030
EU	All	Pallet wrappings and straps for stabilization and protection of products put on pallets during transport	30%	2040
EU	All	Transport packaging in the form of pallets, plastic crates, foldable plastic boxes, pails, and drums	30%	2030
EU	All	Transport packaging in the form of pallets, plastic crates, foldable plastic boxes, pails, and drums	90%	2040
France[98]	All	Packaging	5%	2023
France	All	Packaging	10%	2027
Germany[99]	All	Beverage containers	70%	2022
Germany	All	Food and drink containers on the go	100%	2023

Jurisdiction	Material	Packaging	Target	Target Date
Ireland[100]	All	Single-use packaging	TBD	TBD
Portugal[101]	All	Packaging	30%	2030
Romania[102]	All	Packaging	5%	2020
Romania	All	Packaging	25%	2025
Romania	All	Packaging	80%	n/a
Sweden[103]	All	Packaging	20%	2026
Sweden	All	Packaging	30%	2030

Table 48: Source Reduction Targets

Jurisdiction	Material	Products	Target	Target Date
California[104]	Plastic	Packaging	25%	2032
California	Plastic	Packaging	10%	2032
Canada[105]	Plastic	Flexible straws packaged with beverage	100%	2024
Canada	Plastic	Ring carriers	100%	2024
Canada	Plastic	Single-use checkout bag, cutlery, stir sticks, straws, and expanded polystyrene and polyvinyl chloride foams foodservice ware	100%	2023
EU[106]	All	Packaging	5%	2030
EU	All	Packaging	10%	2035

Jurisdiction	Material	Products	Target	Target Date
EU	All	Packaging	15%	2040
EU	Plastic	Cotton swabs, plastic cutlery, straws, stirrers, balloon sticks, beverage containers/cups made of expanded polystyrene	100%	2020
EU	Plastic	Single-use cups for beverages, including their covers and lids, food containers for immediate consumption with or without a cover	Specific to each Member State, based on an established calculation.	2026
France[107]	Plastic	Beverage bottles	50%	2030
France	Plastic	Single-use packaging	100%	2040
Greece[108]	Plastic	Food containers	30%	2024
Greece	Plastic	Food containers	60%	2026
Spain[109]	All	Packaging	13%	2025
Spain	All	Packaging	15%	2030
Spain	Plastic	Packaging	20%	2030

A.1.2 Recycling Modeling Calculations

This section details the methodology and data assumptions used to estimate the recycling benefits of implementing different policy interventions in Washington State. This section outlines:

1. The material acceptance for materials under interventions modeled,
2. The capture rates for materials under interventions modeled; and
3. The sorting efficiencies for materials under interventions modeled.

A.1.2.2 Material Acceptance under Scenarios

Material acceptance relates to the proportion of households which have recycling services and the materials which are accepted in those services. The material acceptance in the model is categorized according to single-family versus multi-family households, and whether collection took place at curbside or drop-off (e.g., single-family curbside, single-family depot). Under modeled scenarios, Eunomia assumed that single-family and multi-family households had the same material acceptance at both the curbside and depot. The table below outlines the assumed curbside material acceptance rates for single-family and multi-family households.

The material acceptance rates in Washington in 2021 reflect that curbside material acceptance can vary significantly. For example, only 2% of locations accept expanded polystyrene packaging, while 85% of locations accept PET and HDPE in single-family households. Under modeled scenarios, the material acceptance rates were assumed to either be universally accepted across the state or else not at all (e.g., 0% or 100%).

For films, only mono-material films are accepted in curbside programs. However, there are modeled design changes to flexibles between the baseline of 2021 and 2032. Eunomia assumed that 33% of the multi-material films switch into mono-material films by 2032. This is based on the market share of the US Plastic Pact, which has a target of 100% recyclable packaging by 2025.[110] The remaining multi-material flexibles are not accepted in curbside programs.

The assumed material acceptance figures for each scenario are shown in Table 49.

Table 49: Curbside Material Acceptance assumed for SF Households with Service

	2021 Single-Family Households	EPR (Scenarios 1 and 3)	Market-driven (>60%) (Scenario 4)
#1 PET Bottles	85%	100%	100%
#1 PET Other Packaging	85%	100%	0%
#2 HDPE Natural Bottles	85%	100%	100%
#2 HDPE Colored Bottles	85%	100%	100%
#2 HDPE Other Packaging	85%	100%	100%
#3 PVC Packaging	47%	100%	0%

	2021 Single-Family Households	EPR (Scenarios 1 and 3)	Market-driven (>60%) (Scenario 4)
#4 LDPE Packaging	33%	100%	0%
#5 PP Packaging	75%	100%	100%
#6 PS Packaging	33%	100%	0%
#7 Other Packaging	33%	0%	0%
Expanded Polystyrene Packaging	2%	0%	0%
Mono-material Plastic Bags & Film	4%	100%	0%
Other Plastic Film & Flexible Packaging	0%	0%	0%
Remainder/Composite Plastic Packaging	26%	100%	0%
PLA/Compostable Packaging	0%	0%	0%
Steel Cans	86%	100%	100%
Aluminum Cans	86%	100%	100%
Other Nonferrous Metal	86%	100%	100%
Newspaper	85%	100%	100%
Cardboard	85%	100%	100%
Paper Packaging	85%	100%	100%
Mixed Paper	0%	100%	100%
Cartons	44%	100%	100%
Container Glass	63%	100%	100%

The 2021 drop-off material acceptance rates for communities were influenced, in part, by the curbside material acceptance rates. Drop-off requires more active involvement from households, as they need to transport waste to designated drop-off sites. Consequently, estimating more accurate material acceptance rates required an additional step compared to curbside estimates. These proportions were estimated using the Ecology Municipal Waste Management Access Report, by subtracting the number of households with both curbside and drop-off service from the number with access to drop-off services.[111] This enabled the exclusion of households that would be less inclined to use drop-off, given that they could opt for curbside collection. Under modeled scenarios, drop-off rates were assumed to be universally accepted across the state or else not at all (e.g., 0% or 100%). Table 50 provides an overview of assumed drop-off material acceptance rates for single-family and multi-family households.

Table 50: Drop Off Material Acceptance assumed for Single Family and Multifamily

	EPR (Scenarios 1 and 3)	Market-driven (>60%) (Scenario 4)
#1 PET Bottles	100%	100%
#1 PET Other Packaging	100%	100%
#2 HDPE Natural Bottles	100%	100%
#2 HDPE Colored Bottles	100%	100%
#2 HDPE Other Packaging	100%	100%
#3 PVC Packaging	100%	100%
#4 LDPE Packaging	100%	100%
#5 PP Packaging	100%	100%
#6 PS Packaging	100%	100%
#7 Other Packaging	100%	100%
Expanded Polystyrene Packaging	100%	100%
PE Plastic Bags & Film	100%	100%
Other Plastic Film & Flexible Packaging	0%	0%
R/C Plastic Packaging	100%	100%
PLA/Compostable Packaging	0%	0%
Steel Cans	100%	100%
Aluminum Cans	100%	100%
Other Nonferrous Metal	100%	100%
Newspaper	100%	100%
Cardboard	100%	100%
Paper Packaging	100%	100%
Mixed Paper	100%	100%
Cartons	100%	100%
Container Glass	100%	100%

A.1.2.3 Capture Rates under Scenarios

The 2021 Washington single-family capture rates were calculated following the method outlined in Section 2.5.1. Table 51 provides a side-by-side comparison of single-family curbside capture rates for different materials between Washington in 2021 and Seattle in 2022. These Seattle capture rates were provided by King County for this analysis. Note that materials with an asterisk (*) were not accepted under the EPR modeled scenarios at curbside (see Table

49), while materials with a plus sign (+) were not accepted under the market-driven modeled scenario. Hence, any capture rates assumed in this section for those materials would ultimately still result in no material captured, as material acceptance rate multiplied by capture rate would have zeroed out. Seattle capture rates were the starting point for higher capture rates modeled for single-family households under Scenarios 1 and 3. Additional considerations and adjustments for specific materials were implemented on a case-by-case basis, which included analyzing capture rates from other jurisdictions. This is discussed further in the Capture Rates subsection of Section 2.5.1.

Multi-family capture rates were assumed to be 70% of the capture rates for single-family households. This discount reflects the recycling performance in Seattle in multi-family households and may not be applicable statewide.

Under Scenarios 2 and 4, there were no changes in capture rates assumed, as no policies impacting curbside participation were enacted.

Table 51: Single-family Recycling Capture Rates at Curbside[112]

	2021 Washington SF Capture Rate	High Capture Rate (2021 Seattle Rates)
#1 PET Bottles	40%	76%
#1 PET Other Packaging	16%	65%
#2 HDPE Natural Bottles	38%	82%
#2 HDPE Colored Bottles	34%	60%
#2 HDPE Other Packaging	23%	65%
#3 PVC Packaging	0%	33%
#4 LDPE Packaging+	0%	33%
#5 PP Packaging	21%	47%
#6 PS Packaging+	9%	33%
#7 Other Packaging*+	0%	33%
Expanded Polystyrene Packaging*+	16%	9%
PE Plastic Bags & Film+	23%	35%
Other Plastic Film & Flexible Packaging*+	0%	8%
R/C Plastic Packaging+	0%	35%
PLA/Compostable Packaging*+	0%	7%
Steel Cans	34%	73%
Aluminum Cans	50%	91%
Other Nonferrous Metal	78%	80%
Newspaper	76%	91%

	2021 Washington SF Capture Rate	High Capture Rate (2021 Seattle Rates)
Cardboard	78%	89%
Paper Packaging	38%	83%
Mixed Paper	47%	79%
Cartons	2%	58%
Container Glass	50%	74%

For EPS above, the baseline figure Is greater than the high value capture rate assumption. This is likely due to EPS being collected in curbside programs as contamination at baseline, rather than actual targeted capture.

A.1.2.4 Sorting Efficiencies under Scenarios

The materials selected for improved sorting efficiency are detailed in Section 2.5.1. Enhancements in sorting efficiency were presumed to align with global best-in-class standards. Eunomia conducted extensive secondary research to ascertain these benchmarks, drawing from various reputable sources. The following sources were consulted to establish the best-in-class estimates:

- Technical specifications for optical and advanced sorting equipment[113]
- Press release regarding operations at Waste Management (WM)[114]
- Research report on the pilot at MRF of the Future[115]
- Report on best environmental management practice for the waste management sector in the EU[116]
- Cascadia's report on improving recycling infrastructure in Oregon[117]
- RRS' report on MRF material flows[118]

For each material, the improvement assumptions were based on data points gathered from these sources. The table below provides a reference to which source was utilized for each best-in-class estimate. In cases where multiple exemplary instances were identified, the most efficient example was employed, while in others, only one relevant source was available for reference. In cases where material is not sorted for, and therefore viewed as contamination, a value of 100% has been given. Table 52 shows the sorting loss rate by material.

Table 52: Sorting Loss Rates

	2021 Washington	EPR (Scenarios 1 and 3)	DRS (Scenario 2)	Market-Driven (Scenario 4)	Data Source
#1 PET Bottles	10%	2%	2%	2%	Press release regarding operations at WM[119]
#1 PET Other Packaging	11%	2%	2%	2%	Press release regarding operations at WM[120]

	2021 Washington	EPR (Scenarios 1 and 3)	DRS (Scenario 2)	Market-Driven (Scenario 4)	Data Source
#2 HDPE Natural Bottles	4%	2%	2%	2%	Report on best environmental management practice for the waste management sector in the EU[121]
#2 HDPE Colored Bottles	6%	2%	2%	2%	Report on best environmental management practice for the waste management sector in the EU[122]
#2 HDPE Other Packaging	5%	5%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[123]
#3 PVC Packaging	100%	10%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[124]
#4 LDPE Packaging	100%	10%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[125]
#5 PP Packaging	42%	10%	10%	10%	Report on best environmental management practice for the waste management sector in the EU[126]
#6 PS Packaging	15%	10%	2021 estimate	10%	Report on best environmental management practice for the waste management sector in the EU[127]
#7 Other Packaging	100%	15%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[128]
Expanded Polystyrene Packaging	77%	20%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[129]
PE Plastic Bags & Film	89%	30%	2021 estimate	2021 estimate	Research report on the pilot at MRF of the Future[130]
Other Plastic Film & Flexible Packaging	100%	2021 estimate	2021 estimate	2021 estimate	N/a, not sorted
Remainder/Composite Plastic Packaging	100%	30%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[131]
Steel Cans	5%	3%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[132]
Aluminum Cans	5%	4%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[133]

	2021 Washington	EPR (Scenarios 1 and 3)	DRS (Scenario 2)	Market-Driven (Scenario 4)	Data Source
Other Nonferrous Metal	25%	20%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[134]
Newspaper	1%	1%	2021 estimate	2021 estimate	Best in class in state
Cardboard	1%	1%	2021 estimate	2021 estimate	Best in class in state
Paper Packaging	8%	1%	2021 estimate	2021 estimate	Best in class in state
Mixed Paper	7%	5%	2021 estimate	2021 estimate	Best in class in state
Cartons	100%	10%	2021 estimate	2021 estimate	Report on best environmental management practice for the waste management sector in the EU[135]
Container Glass*	5%	10%	2021 estimate	2021 estimate	Glass Recycling Coalition Gold Standard for Single Stream[136]

*Note: the 2021 sorting loss for glass does not include glass which is sent for alternate daily cover (ADC) as "losses"; they are instead included under disposal. Under the EPR scenarios, all glass is assumed to be sorted for recycling end markets (secondary MRFs, glass bottlers or fiberglass). If including ADC as "residue losses", the residue rate would be closer to 50%. The 10% rate under the EPR scenarios is therefore an improvement.

A.1.3 Reuse Modeling Calculations

This section details the product selection and calculations implemented to determine the waste flow benefits of switching packaging to reuse and discusses the following:

1. The product selection process for reusable modeling.
2. The calculation process for the tonnage of each chosen product generated at baseline.
3. The key reuse modeling assumptions for each product.

A.1.3.1 Product Selection Criteria

Products were selected based on a selection of variables, as discussed in Section 2.5.2 and described in Table 53.

Table 53: Product Selection Criteria

	Criterion	Description
1	Relative importance in expenditure	Relates to how frequently households purchase a product.

	Criterion	Description
2	Existence of reusable alternative	Whether a reusable alternative is already in existence for the product.
3	Feasibility of replacing with reusable alternative	The technical feasibility (easy, medium, hard) of establishing a system based on the reusable alternative for the product. This considers consumer usage, washing and cleaning, and return infrastructure.
4	Reuse program currently exists at relative scale in other Jurisdictions	Whether a reusable system for this product exists in other jurisdictions, at commercial scale.
5	Single-use material type	The material(s) associated with the single-use packaging of the product. For example, some harder to recycle plastics (e.g., polystyrene take-away containers) are a higher priority for non-recycling-based solutions.
6	Baseline recycling rate of single-use material	The baseline recycling rate of the material; a lower recycling rate may indicate a greater need for reuse (e.g., plastic takeaway clamshells).
7	Reuse targets exist for product in European Commission draft legislation[137]	Whether the draft legislation for the European Commission includes a target for this product. The European Commission targets were used as they have the most detailed and extensive product list for reuse among the jurisdictions researched.
8	Product sensitivity to reusable system	The sensitivity of the product to the logistics of a reusable system, including transportation, hygiene, temperature control.

Table 54 shows how each of the products were assessed against the criteria above. In some cases, products had multiple potential materials that could be switched to reuse. In these cases, multiple values have been given for Criteria 5 in Table 54.

As an example, in Table 54 below, breakfast cereal has a relative importance that is in the middle of products examined, the technical feasibility of switching to reuse is easy, and it has reuse programs in other jurisdictions. The material category has consideration in European Union reuse targets as well under “grouped packaging in boxes”. This candidate was therefore deemed a good product for reuse.

Bread, on the other hand, has a high relative importance, the technical feasibility of switching to reuse is medium, and there are no reuse systems at scale in other jurisdictions. Therefore, it was not chosen for reuse modeling in this study.

Table 54: Product Matrix for Reuse Candidates

Key:

Table:

Product List Below (initially drawn from the US CPI and expanded on)	Modeled	Reason for Not Modeling	Potential impact of product based on market share in HH expenditure (Consumer Price Index data)	Existence of Reusable Alternative	Technical feasibility of replacing with reusable alternative (Easy, med, difficult)	Reuse Program Exists at Scale Somewhere	Material 1	Washington Recycling Rate Material 1	Material 2	Washington Recycling Rate Material 2	Reuse Target for Specific Product Under Consideration in Europe	Product Feasibility/ Sensitivity
Criteria # →			1	2	3	4	5	6	5	6	7	8
Flour and prepared flour mixes	N	Limited tonnage - low impact	0.065	Y	Easy	Y in bulk	Paper Packaging	36%		N/A	N	

Product List Below (initially drawn from the US CPI and expanded on)	Modeled	Reason for Not Modeling	Potential impact of product based on market share in HH expenditure (Consumer Price Index data)	Existence of Reusable Alternative	Technical feasibility of replacing with reusable alternative (Easy, med, difficult)	Reuse Program Exists at Scale Somewhere	Material 1	Washington Recycling Rate Material 1	Material 2	Washington Recycling Rate Material 2	Reuse Target for Specific Product Under Consideration in Europe	Product Feasibility/ Sensitivity
Breakfast cereal	Y	N/A	0.149	Y	Easy	Y in bulk	Paper Packaging	36%		N/A	Y	Low
Rice, pasta, cornmeal	Y	N/A	0.183	Y	Easy	Y in bulk	Paper Packaging	36%		N/A	N	Low
Bread	N	No evidence of reuse system or reuseable alternatives	0.238	N	Medium	N	PE Plastic Bags & Film	1%		N/A	N	
Fresh biscuits, rolls, muffins	N	No evidence of reuse system or reuseable alternatives	0.119	N	Medium	N	#1 PET Other Packaging	14%		N/A	N	High
Cakes, cupcakes, cookies	N	No evidence of reuse system or reuseable alternatives	0.244	N	Medium	N	#1 PET Other Packaging	14%		N/A	N	High
Other bakery products	N	No evidence of reuse system or reuseable alternatives	0.260	N	Medium	N	#1 PET Other Packaging	14%		N/A	N	High
Meats	N	No evidence of reuse system or reuseable alternatives	1.251	N	Hard	N	PE Plastic Bags & Film	1%		N/A	N	High
Eggs	N	Hard technical feasibility of reuse program	0.195	Y	Hard	N	Paper Packaging	36%		N/A	N	

Product List Below (initially drawn from the US CPI and expanded on)	Modeled	Reason for Not Modeling	Potential impact of product based on market share in HH expenditure (Consumer Price Index data)	Existence of Reusable Alternative	Technical feasibility of replacing with reusable alternative (Easy, med, difficult)	Reuse Program Exists at Scale Somewhere	Material 1	Washington Recycling Rate Material 1	Material 2	Washington Recycling Rate Material 2	Reuse Target for Specific Product Under Consideration in Europe	Product Feasibility/ Sensitivity
Milk	Y	N/A	0.233	Y	Easy	Y - since the 1950's, **still in UK, US.**	Cartons	1%	#2 HDPE Natural Beverage Containers	30%	Y	Low
Cheese and related products	N	No evidence of reuse system or reuseable alternatives	0.254	N	Easy	N	PE Plastic Bags & Film	1%		N/A	N	High
Ice cream and related products	N	No evidence of reuse system in other jurisdictions	0.120	Y	Easy	N	Paper Packaging	36%		N/A	N	Low
Carbonated drinks	Y	N/A	0.386	Y	Easy	**Y Germany, Nordics, Mexico, Southeast Asia**	#1 PET Beverage Containers	30%	Aluminum Beverage Containers	36%	Y	Low
Frozen noncarbonated juices and drinks	N	N/A	0.010	Y	Easy	N	#1 PET Bottles	27%		N/A	N	
Nonfrozen noncarbonated juices and drinks	Y	N/A	0.482	Y	Easy	Y - Germany, Austria	#1 PET Beverage Containers	30%	Container Glass Beverage Containers	38%	Y	Low
Coffee	N	N/A	0.200	Y	Medium	N	Container Glass Beverage Containers	38%		N/A	N	Low

Product List Below (initially drawn from the US CPI and expanded on)	Modeled	Reason for Not Modeling	Potential impact of product based on market share in HH expenditure (Consumer Price Index data)	Existence of Reusable Alternative	Technical feasibility of replacing with reusable alternative (Easy, med, difficult)	Reuse Program Exists at Scale Somewhere	Material 1	Washington Recycling Rate Material 1	Material 2	Washington Recycling Rate Material 2	Reuse Target for Specific Product Under Consideration in Europe	Product Feasibility/ Sensitivity
Other beverage materials, including tea	Y	N/A	0.118	N	Easy	N	#1 PET Bottles	27%	Container Glass	31%	Y	Low
Fats and oils	N	Limited tonnage - low impact - limited data availability of material composition	0.263	Y	Medium	Y in bulk	#1 PET Bottles	27%		N/A	N	Low
Snacks	N	Medium difficulty in switching to reuseable system, no product-specific target in other jurisdictions	0.390	Y	Medium	Y in bulk	Other Plastic Film & Flexible Packaging	0%		N/A	N	Low
Spices, seasonings, condiments, sauces	N	Medium difficulty in switching to reuseable system, no product-specific target in other jurisdictions	0.364	N	Medium	N	#7 Other Packaging		Container Glass	31%	N	Low
Baby food	N	Not in scope	0.042	N	Medium	N	#1 PET Other Packaging	14%		N/A	N	Low

Product List Below (initially drawn from the US CPI and expanded on)	Modeled	Reason for Not Modeling	Potential impact of product based on market share in HH expenditure (Consumer Price Index data)	Existence of Reusable Alternative	Technical feasibility of replacing with reusable alternative (Easy, med, difficult)	Reuse Program Exists at Scale Somewhere	Material 1	Washington Recycling Rate Material 1	Material 2	Washington Recycling Rate Material 2	Reuse Target for Specific Product Under Consideration in Europe	Product Feasibility/ Sensitivity
Full service meals and snacks	N	Not in scope	2.335	N	Medium	N		N/A		N/A	N	High
Limited service meals and snacks	N	Not in scope	2.826	Y	Easy	N	#1 PET Other Packaging	14%	Paper Packaging	36%	Y	Medium
Food from vending machines and mobile vendors	N	Limited tonnage - low impact - limited data availability of material composition	0.047	Y	Easy	N		N/A		N/A	N	Low
Beer, ale, and other malt beverages at home	Y	N/A	0.227	Y	Easy	Y - Germany, Alberta, Ontario	Container Glass Beverage Containers	38%		N/A	Y	Low
Distilled spirits at home	Y	N/A	0.089	Y	Easy	N	Container Glass Beverage Containers	38%		N/A	Y	Low
Wine at home	Y	N/A	0.130	Y	Easy	N	Container Glass Beverage Containers	38%		N/A	Y	Low
Hair, dental, shaving, and miscellaneous personal care products	N	No evidence of reuse system in other jurisdictions	0.358	Y	Medium	N	#5 PP Packaging	7%		N/A	N	Low

Product List Below (initially drawn from the US CPI and expanded on)	Modeled	Reason for Not Modeling	Potential impact of product based on market share in HH expenditure (Consumer Price Index data)	Existence of Reusable Alternative	Technical feasibility of replacing with reusable alternative (Easy, med, difficult)	Reuse Program Exists at Scale Somewhere	Material 1	Washington Recycling Rate Material 1	Material 2	Washington Recycling Rate Material 2	Reuse Target for Specific Product Under Consideration in Europe	Product Feasibility/ Sensitivity
Cosmetics, perfume, bath, nail preparations and implements	N	No evidence of reuse system in other jurisdictions	0.260	Y	Medium	N	#5 PP Packaging	7%		N/A	N	Low
Unsampled personal care products	N	No evidence of reuse system in other jurisdictions	0.020	Y	Medium	N	#5 PP Packaging	7%		N/A	N	Low
E-commerce - Transport Packaging	Y	N/A	N/A	Y	Easy	N	Cardboard	59%		N/A	Y	Low
Home care	N	No evidence of reuse system in other jurisdictions	N/A	Y	Easy	Y in concentrate						Low

A.1.3.2 Product Tonnage Modeling

Below is the methodology applied for calculating the packaging tonnage at baseline for the products detailed in Section 2.5.2. Calculating each of the tonnages was necessary to estimate the benefits of switching some of the product into reuseable packaging.

Beverage Containers

Beverage packaging tonnages were taken from the 2021 CPPP study published by Ecology. These tonnages were combined with Beverage Market Data Analysis (BMDA) from 2018[138], which shows the split of beverage containers sold by beverage type. Table 55 shows the total tonnage of beverage containers generated by the residential sector for Washington.

Table 55: Residential Beverage Container Tonnage in Washington (2021)

Material	Total Residential Generated (tons, 2021)
#1 PET Beverage Containers	34,300
#2 HDPE Natural Beverage Containers	8,140
#2 HDPE Colored Beverage Containers	1,370
Aluminum Beverage Cans	21,750
Carton Beverage Containers	3,950
Container Glass Beverage Containers	118,000
Total Beverage Containers	187,510

These tons were then combined with the BMDA data to find the total tonnage of each beverage container type generated at baseline, as shown in Table 56. Note no data could be found on PP beverage containers for Washington.

Table 56: Residential Beverage Container Tonnage by Beverage Type

	Carbonated Beverages	Wine	Non-carbonated Beverages	Spirits	Beer	Coffee	Milk	Total
#1 PET Beverage Containers	6,310	40	24,250	810	10	2,430	450	**34,300**
#2 HDPE Natural Beverage Containers	0	0	2,970	0	0	610	4,560	**8,140**
#2 HDPE Colored Beverage Containers	0	0	1,140	0	0	230	0	**1,370**
Aluminum Beverage Cans	6,480	0	4,000	0	10,340	930	0	**21,750**

	Carbonated Beverages	Wine	Non-carbonated Beverages	Spirits	Beer	Coffee	Milk	Total
Carton Beverage Containers	0	60	1,150	0	0	20	2,720	**3,950**
Container Glass Beverage Containers	3,800	35,720	4,660	16,680	47,070	9,380	680	**117,990**
Total	**16,590**	**35,820**	**38,170**	**17,490**	**57,420**	**13,600**	**8,410**	**187,500**

Take-away Food Packaging Containers

Overall generated waste from takeaway food establishments was estimated using California's Business Group Waste Stream Calculator data, which is based on a 2006 waste composition study for fast food restaurants.[139] This report found that fast food restaurants generate around 6,500 pounds of MSW per employee per year. Of this, 40% is OCC, glass, or plastic packaging. Multiplying 40% by the total 6,500 MSW pounds generated per employee yields a packaging generation rate of 2,600 pounds per employee.

As this figure is only for waste generated within the restaurant, and the scope of this study is for the residential sector, the tonnage of waste generated from packaging originating at the restaurant but consumed away from it was calculated. A figure of 30% of packaging waste generated in-store was used from a Kearney report for the European informal eating out sector.[140] This was the only data that could be found on the proportion of packaging waste generated at the store versus away from a store for limited-service restaurants.

This yielded a figure of 6,200 pounds per employee of limited-service packaging consumed away from the store. This figure was then multiplied by the total number of employees working in the limited-service restaurant industry in Washington State, which was sourced from the US Census Bureau's County Business Patterns dataset for 2021.[141] This provided a total tons of packaging waste generated from limited-service restaurants (discarded away from the store) of 245,000 tons. That figure was then multiplied by 50% to produce an estimate for the tonnage only generated by the residential sector; this is an assumption due to data limitations.

OCC e-commerce boxes

Tonnage was estimated using national parcels per capita generation rate estimates from the Pitney Bowes Parcel Shipping Index and a composition of parcel material type from a 2019 Packworld survey of 185 e-commerce brands.[142,143] The Pitney Bowes index reported that the per capita rate of parcel generation in the US in 2021 was 65 parcels per capita. This includes non-OCC parcels, so the 65 parcels per capita number was then multiplied by the parcel composition from the Packworld study. The study indicated that 68% of the secondary parcel packaging shipped was OCC. Multiplying this figure by the 65 parcels per capita yielded a total OCC parcel per capita rate of 44.

This parcel rate would include both the residential- and commercial-generated OCC parcels. The figure was therefore multiplied by the overall split of cardboard generated between the residential and commercial sectors in Washington from the 2021 CPPP study.[144] Overall, 17 OCC parcels per person were estimated to be generated by the residential sector per year.

To estimate an overall tonnage, the figure of 17 OCC parcels per capita was multiplied by an average OCC parcel weight of 0.7 lbs.[145] This resulted in an overall generation number of 45,000 tons when scaled to the Washington population.

Cereal Boxes

Tonnage was estimated using the number of boxes consumed nationally, based on Kiplinger data[146], and scaling this figure to the Washington population for 2021.[147]

A.1.3.3 Product by Product Reuse System Assumptions and Packaging Characteristics

The system assumptions for each product switched to reuse are shown in Table 57. These are the design assumptions which drive the flow of reusable packaging in Washington over a given year. Each assumption helps determine the starting generation of reusables needed and the average number of trips and replacements needed each year. This is necessary to estimate the weight of single-use packaging that is replaced by reusables, as the higher the retention rate of reusables over a year, the fewer replacements are needed and the greater the weight of packaging displaced.

Table 57: Reuse System Assumptions by Product

Variable	Units	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8	Product 9	Product 10
Products	N/A	Beer	Milk	OCC Transport Parcels	Wine	Carbonated Beverage	Non-Carbonated Beverages	Takeaway Food	Cereal Boxes	Takeaway Food	Takeaway Food
Single-Use Material	N/A	Container Glass	#2 HDPE Natural Bottles	Cardboard	Container Glass	#1 PET Bottles	#1 PET Bottles	#1 PET Other Packaging	#5 PP Packaging	#6 PS Packaging	Cardboard
Reuse Material	N/A	Reusable Glass	Reusable Glass	Reusable PP Plastic	Reusable Glass	Reusable PET	Reusable PET	Reusable PP Plastic	Reusable PP Plastic	Reusable PP Plastic	Reusable PP Plastic
Reuse Target[i]	% of product uses	20%	20%	10%	10%	20%	20%	10%	10%	10%	10%
Return Rate[ii]	% of Containers	95%	95%	95%	95%	95%	95%	95%	100%	95%	95%
Days between servings[iii]	Days	60	60	60	60	60	60	15	15	15	15
Breakage Rate[iv]	% of Returned Containers	1%	2%	1%	1%	2%	2%	1%	1%	1%	1%
Maximum Number of Rotations[v]	# of rotations	50	50	12	50	20	20	50	100	50	50
Weight of Single-Use Used Container	Containers per Ton	4,107	22,880	2,845	1,594	23,182	63,039	36,288	10,080	36,288	40,000
Weight of reusable container	Containers per Ton	1,744.62	11,440	1,000.00	1,512.00	11,591	31,519.53	25,401.60	1,000.00	22,680.00	22,680.00

Key assumptions noted in Table 57 are as follows:

i. **Reuse target:** The reuse targets were modeled based on the draft products targets for the European Commission. These targets are the most extensive and detailed on a product-by-product basis, and thus have been used as the basis for modeling. Additionally, Eunomia has researched and informed the targets currently being considered by the Commission.[148] This research includes interviews and analysis on the "critical mass" of different containers which need to be switched to reusable containers. Eunomia has also interviewed reuse programs like the Beer Store in Ontario and GDB in Germany to inform the reuse proportions.

ii. **Return rate**: Return rates assume there is an incentive in place to achieve the return rates needed for a reusable system to be economically viable. Viable return rates in the mid to high 90s are established in Zero Waste Europe's Economics of Reuse Report, as well as Eunomia modeling.[149] Return rates for cereal boxes are assumed to be higher, as they are part of a refill program and do not require consumers to return their reusable containers.

iii. **Days between servings**: Days between servings is the full time it takes for a consumer to consume the product, return the product, and have that product go through reverse logistics and refilling for new use. Beverage container days were sourced from interviews with The Beer Store in Ontario, GDB in Germany, and data from Zero Waste Europe. Take-away food packaging days were sourced from Zero Waste Europe's Economics of Reuse Report.[150] There is limited data on the return rate of transport parcels from households. Interviews with programs that provide reusable transport parcels for commercial and industrial customers report quick turnarounds of 1-2 weeks. A conservative 60-day time for full rotation is then assumed for the residential parcels. Reusable cereal boxes are assumed to have a full rotation length of 15 days, as they are part of a refill system and do not need to go through reverse logistics.

iv. **Breakage rate**: Breakage rates for glass were sourced from interviews with glass reusable programs in Canada. These systems report a breakage rate of around 1% of what is returned. Returned plastics were assumed to have a 2% breakage rate, as reusable plastics must also pass odor and discoloration tests in addition to withstanding scratches and functional deterioration.

v. **Maximum number of rotations**: The maximum number of rotations is the average number of times a container can go through the reuse system before it is retired. The higher the maximum number of rotations, the fewer reusable containers need to be purchased and the more material can be displaced through reuse. The maximum values were sourced from interviews with GDB, the Beer Store, and data from Zero Waste Europe. Cereal boxes were assumed to have a higher maximum number of rotations than other reusable packaging, as the latter is part of a refill network and thus not subject to as many points of handling as the other products. Consumers use the reusable cereal boxes, wash it themselves, and then bring back boxes empty to the store for another use. This is contrasted with other reusable products where consumers will drop off their empties, and those empties must be transported to washing and filling at a separate location, adding additional time before the product is used again.

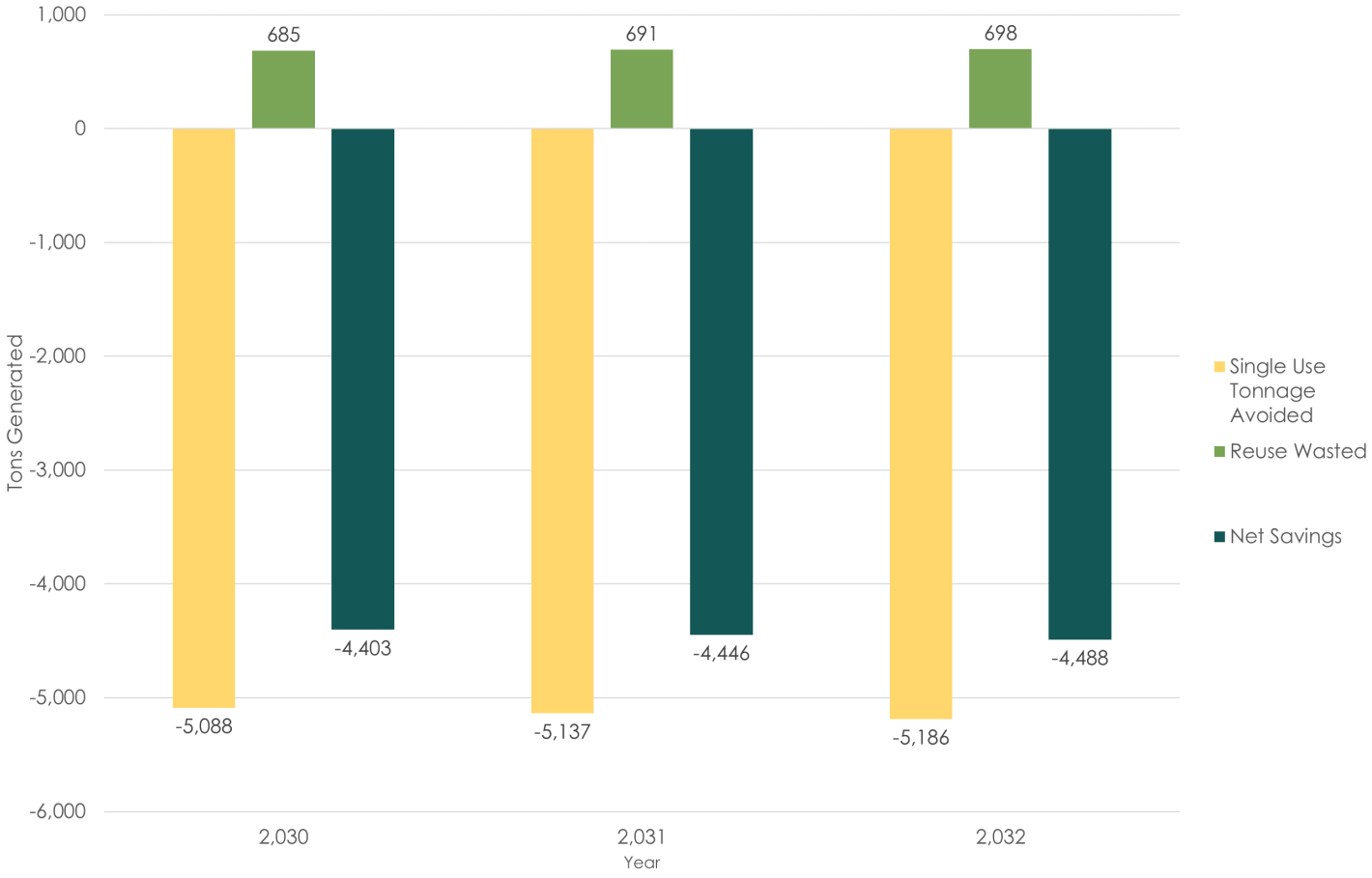
Each product had its own calculations for switching to reuse. The calculations were centered on the number of uses needed for each product at baseline, and how many of those uses were then switched to reuse. To conduct modeling, the following were calculated for each product:

- The baseline number of uses.

- The number of total uses in reuse under the reuse scenarios.
- The associated single-use tonnage displaced as a result of the reuse scenarios.
- The number of reusable containers purchased and discarded in a given year.

The modeling output produced the savings of single-use containers as well as the tonnage of reusable materials disposed. This is illustrated in Figure 21. The graphic shows the annual savings in material generation from switching 20% of PET non-carbonated beverage bottle uses to reuse by 2032.

Figure 21: Generation Savings of Non-Carbonated Beverages Through Reuse



A.2.0 Supporting Survey Materials and Results

This appendix includes the actual survey (English version) provided to respondents and outlines the full findings from the survey conducted from September 18, 2023 to October 9, 2023. Included are individual question data in the form of charts and tables, with summary tables containing data across different audience segments and summary text describing the findings from the charts and tables.

A.2.1 Survey Questions (English Version)

Washington State Department of Ecology Recycling Survey

[text display] Welcome! Thank you for participating in this survey!

The purpose of this survey is to help the Washington State Department of Ecology understand opinions and experiences related to recycling. Results of this survey will be used to help inform recycling policy in Washington.

This survey will take approximately 15 minutes to complete. All your responses will be kept confidential. When answering the questions, it is very important that you answer honestly. There are no right or wrong answers.

If you would like to take the survey in Spanish, please select Spanish in the top right corner of this page.

When you're ready to begin, click "Next"

Q1. Which category includes your age?

- 17 or younger [terminate]
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64

- 65+

Q2. In which country do you currently reside?

- Canada
- Mexico
- China
- U.S. [terminate if not selected]
- U.K.
- Other

Q3. In which state do you currently reside?

- Insert state list [terminate if not Washington]

Q4. In which county do you reside?

- Insert county list

Q5. Do you live in an unincorporated area?

- Yes
- No [programming note: code as county/unincorporated recycling code]
- Unsure

Q6. In which city do you currently reside, if applicable?

- Insert city list FOR COUNTY + other

Q7. Which of the following best describes your type of home?

- Single-family (including mobile home)
- Multi-family (e.g. apartment, condominium, etc
- Other [terminate]

Q8. Do you rent or own your current residence?

- Rent
- Own

- Other

Q9. Which of the following best describes where you live?

- Urban
- Suburban
- Rural

Q10. Which of the following do you identify with? Select all that apply.

- American Indian or Alaska Native *
- Asian or Asian American *
- Black or African American *
- Hispanic or Latino/Latina/Latinx *
- Native Hawaiian or other Pacific Islander *
- White
- Something else (please specify): _____
- Prefer not to respond

Q11. How important is recycling to you personally?

- Very Important
- Important
- Moderately Important
- Somewhat Important
- Not Important at All

Q12. [if single-family for Q7] Do you currently have curbside recycling service (e.g. where recyclables are picked up at your home and brought to a recycling facility) for your household?

- Yes
- No
- Not sure

Q13. [if no to Q12] Do you drop off your recycling at a recycling drop-off location or transfer station?

- Yes
- No

Q14. [if yes to Q12] Do you currently pay for your recycling service?

- Yes
- No
- Not sure

Q15. [if multi-family for Q7] Does your building or complex provide a bin for recycling?

- Yes
- No
- Not sure

Q16. [if no to Q15] Do you drop off your recycling at a recycling drop-off location or transfer station?

- Yes
- No

Q17. Approximately how much of your household's recyclable items do you think your family recycles on a monthly basis?

- All
- Most
- Some
- None

Q18. [if no to Q12] Is curbside recycling service available to your household, as in, could you subscribe to recycling service but you choose not to?

- Yes, recycling service is available
- No, recycling service is not available [quota: goal 300]
- I'm unsure if recycling service is available

Q19. [if no or unsure to Q15] Would you participate in recycling if it was available at your building or complex and was free of charge?

- Yes

- No
- Not sure

Q20. [if no or unsure to Q12] Would you participate in curbside recycling service at your home if it was available in your community and free of charge?

- Yes
- No
- Not sure

Q21. [if yes to Q12 or if yes to Q15] How would you rate your recycling service on the following attributes?

Consistency

Very Consistent	Somewhat Consistent	Neutral	Somewhat Inconsistent	Very Inconsistent

Affordability

Very Affordable	Somewhat Affordable	Neutral	Somewhat Expensive	Very Expensive

Ease of Understanding

Very Easy to Understand	Somewhat Easy to Understand	Neutral	Somewhat Confusing	Very Confusing

Convenience

Very Convenient	Somewhat Convenient	Neutral	Somewhat Inconvenient	Very Inconvenient

Q22. How confident are you that you are recycling items correctly in your bin?

- Very confident
- Confident
- Moderately confident
- Somewhat confident
- Not confident at all
- N/A - I do not recycle [anchor]

Q23. How confident are you that items being put in recycling bins are actually being recycled and made into new products? Please use a scale from 1 to 5, where 1 is not confident at all and 5 is extremely confident.

- Very confident
- Confident
- Moderately confident
- Somewhat confident
- Not confident at all

Q24. When you recycle, which of the following best describes why? Please select all that apply. [randomize]

- It's easy/convenient
- I want to keep recyclables out of landfills
- It gives me more space in my trash can
- It helps me have a smaller trash can which saves me money on my garbage bill
- Because it's the right thing to do.
- To reduce pollution
- To conserve natural resources
- Other (please specify) [anchor]

- N/A - I do not recycle [anchor]

Q25. Which of the following, if any, are your biggest challenges to recycling **at home**? Please select all that apply. [randomize]

- Unsure what can and can't be recycled
- Recycling is not picked up often enough
- Recycling service is expensive
- Recycling service is not available where I live
- Cannot recycle certain items in my community
- What can and can't be recycled is different from place to place
- Where I put my recycling to be picked up is not convenient
- Recycling is not available
- Other (please specify) [anchor]
- None of the above [anchor]

Q26. Which of the following, if any, are your biggest challenges to recycling **on the go**? Please select all that apply. [randomize]

- Unsure what to recycle
- I don't know where I can recycle when on the go
- Recycling bins are not available when on the go
- What can and can't be recycled is different from place to place
- Recycling bins aren't clearly labeled
- There aren't enough public recycling bins
- Other (please specify) [anchor]

[programming note: randomize next four questions]

Q27. How much do you agree or disagree with the following statement: **Recycling should be free for everyone in Washington.**

- Strongly agree
- Agree

- Neither agree nor disagree
- Disagree
- Strongly disagree

Q28. How much do you agree or disagree with the following statement: **Everyone in Washington should be able to recycle the same items, regardless of where they live.**

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Q29. How much do you agree or disagree with the following statement: **Everyone in Washington should have access to convenient recycling options.**

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Q30. How much do you agree or disagree with the following statement: **Reducing waste is important.**

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Q31. Thinking about the companies that make the products and packaging that you buy, how much do you agree or disagree with the following statements. Use a scale from 1 to 5, where 1 is strongly disagree and 5 is strongly agree. [randomize subquestions]

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Companies should design product packaging that is easily recyclable					
Companies should take responsibility for recycling the packaging that their products come in					
Companies should pay for the recycling systems needed to allow for their packaging to be easily recycled					
Companies should include recycled content in their packaging to ensure recyclables are made into new things					
Companies should design product packaging using the least amount of material possible to help reduce waste					

The Washington State Legislature is considering a beverage container deposit program. This type of program adds 10 cents to every beverage container—such as an aluminum can, or a plastic or glass bottle—purchased. People receive the 10-cent deposit back for every beverage container returned to a drop-off location. You can still put beverage containers in the recycling bin at home, but you would not get the 10-cent deposit back.

Q32. If this beverage container deposit program was available in your community, how likely would you be to return your beverage containers?

- Very likely
- Likely
- Moderately likely
- Somewhat likely
- Not likely at all

Q33. Which of the following best describes why you would participate in this beverage container deposit program? Please select your top two reasons. [randomize]

- Because recycling is important to me
- To receive a 10-cent deposit back
- To reduce litter
- To reduce bottles/cans in landfills
- To make sure my bottles/cans are recycled
- Other (Please specify) [anchor]
- I would not participate [anchor]

Q34. Which of the following best describes why you would not participate in this beverage container deposit program? Please select your top two reasons. [randomize]

- I don't have a way to transport bottles/cans to deposit return center
- It would take too much time to take my bottles/cans to a deposit return center
- I don't have a place to store bottles/cans at home
- It would be easier to just put them in my bin at home
- Other (Please specify) [anchor]
- I would participate [anchor]

Q35. How much, if at all, would paying the 10-cent deposit for bottles and cans impact you?

- Significant negative impact
- Slight negative impact
- No impact

Q36. If this program were established in Washington, how far from your home would you be willing to travel to return containers to get your deposit refund?

- Less than 1 mile
- 1-2 miles
- 3-5 miles
- 6-10 miles
- 11-15 miles

- More than 15 miles
- n/a – I would not participate

Q37. What additional information, if any, would you like to know to determine whether you think a beverage container deposit program would be something you would support?

OPEN END [not mandatory]

[text display] The following are for classification purposes only.

Q38. What gender do you identify with?

- Female
- Male
- Non-binary
- Transgender
- Something else (Please specify)
- Prefer not to respond

Q39. Do you identify as LGBTQ+?

- Yes
- No
- Prefer not to respond

Q40. What is the highest level of education you have received?

- Attended some high school or less
- High school graduate
- Completed some college
- Graduate of a 2-yr college
- Graduate of a 4-yr college
- Trade/vocational school graduate
- Post-graduate degree

- Prefer not to respond

Q41. Which of the following best describes your total annual household income?

- Less than $25,000
- $25,000-$49,999
- $50,000-$74,999
- $75,000-$99,999
- $100,000-$149,999
- $150,000 or more
- Prefer not to respond

Q42. [for in-person/partner links] The first 875 people will receive a $10 gift card for completing this survey. If you qualify and would like to receive the incentive, please input your email below. We will email you if you will be receiving a gift card and you will have 48 hours to reply. The incentive will be sent from "noreply@tangocard.com." Please check your spam or junk mail. Please note: we will not save your email past the completion of this research.

First Name: _____

Last Initial: _____

Email Address: _____

A.2.2 Recycling Access and Participation

Table 58 indicates that about two-thirds (68%) of single-family residents participate in curbside recycling, and about three quarters (75%) pay for the service. Curbside recycling is available to less than a quarter (22%) of single-family residents who do not currently use curbside recycling. However, Table 58 also indicates that over three-quarters (77%) of those who do not have curbside recycling do recycle at a drop-off location or transfer station. About three-quarters of those in single-family homes who do not use curbside recycling (76%) would participate in curbside recycling if it were available and free of charge.

Table 58: Curbside Recycling Behaviors for Single-family Residents

	Yes	No	Not sure
Do you currently have curbside recycling service (e g where recyclables are picked up at your home and brought to a recycling facility) for your household? (n=1,464)	68%	29%	3%
Do you currently pay for your recycling service? (n=998)	75%	18%	7%
Is curbside recycling service available to your household, as in, could you subscribe to recycling service but you choose not to? (n= 418)	22%	61%	18%
Do you drop off your recycling at a recycling drop-off location or transfer station? (n=418)	77%	23%	0%
Would you participate in curbside recycling service at your home if it was available in your community and free of charge? (n=466)	76%	13%	11%

Table 59 displays the responses of residents in single-family homes to questions about their current and intended recycling behavior. Responses are displayed for both the overall sample and by key segments. Rural residents are much less likely to report that they currently have curbside recycling (31%) compared to Urban (78%) or Suburban (81%) respondents. However, their responses to the other items in this table are similar to Urban and Suburban residents.

Those in the Central part of the state are less likely than others to report current curbside recycling (27% versus 82% Western and 68% Eastern), yet more likely to indicate that they would participate in curbside recycling were it available for free recycling (84% versus 66% Western and 76% Eastern) than are those in the other regions.

Table 59 also shows that BIPOC residents are less likely to indicate that they would participate in curbside recycling were it available for free (62%) than residents of other ethnic groups (81% White and 84% Hispanic or Latino/Latina/Latinx).

Table 59: Single-family Recycling Experience by Segment

Segment		Do you currently have curbside recycling service (e g where recyclables are picked up at your home and brought to a recycling facility) for your household?		Do you currently pay for your recycling service? (Among Yes to Recycle at House)		Do you drop off your recycling at a recycling drop-off location or transfer station? (Among No to Recycle at House)		Would you participate in curbside recycling service at your home if it was available in your community and free of charge? (Among No or Not Sure to Recycle at House)	
		Number of Respondents	% Yes	Number of Respondents	% Yes	Number of Respondents	% Yes	Number of Respondents	% Yes
Overall		1,464	68%	998	75%	418	77%	466	76%
Community Type	Urban	476	78%	370	72%	85	62%	106	67%
	Suburban	637	81%	518	77%	100	74%	119	76%
	Rural	351	31%	110	75%	233	84%	241	80%
Geographic Region	Western	686	82%	560	80%	106	66%	126	66%
	Central	227	27%	62	61%	156	83%	165	84%
	Eastern	551	68%	376	69%	156	79%	175	76%
Ethnicity	White	972	67%	654	74%	291	77%	318	81%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	171	74%	127	82%	41	78%	44	84%
	BIPOC (excluding Hispanic/Latino/ Latina/Latinx)	271	70%	189	73%	69	71%	82	62%

Table 60 shows that about seven in ten (71%) of those who live in multi-family units or buildings report that their complex provides a bin for recycling. It also indicates that over half (53%) of those whose building does not provide recycling do recycle at a drop-off location or transfer station. Close to three quarters of those in multi-family units (73%) who do not have current access to curbside recycling would recycle were curbside recycling available and free of charge.

Figure 22 displays the recycling rates of both single-family and multi-family residents. While more than three quarters (76%) of those in single-family homes report that they recycle all or most of their recyclable items each month, just under two-thirds (63%) of those in multi-family units report the same.

Table 60: Building Recycling Availability and Drop Off Among Multi-Family Residents Who Do Not Have Bin Provided at Building

	Yes	No	Not sure
Does your building or complex provide a bin for recycling? (n=767)	71%	24%	4%
Do you drop off your recycling at a recycling drop-off location or transfer station? (n=219)	53%	47%	0%

Would you participate in recycling if it was available at your building or complex and was free of charge? (n=219)	73%	18%	10%

Figure 22: How Much of Household Recyclables are Being Recycled

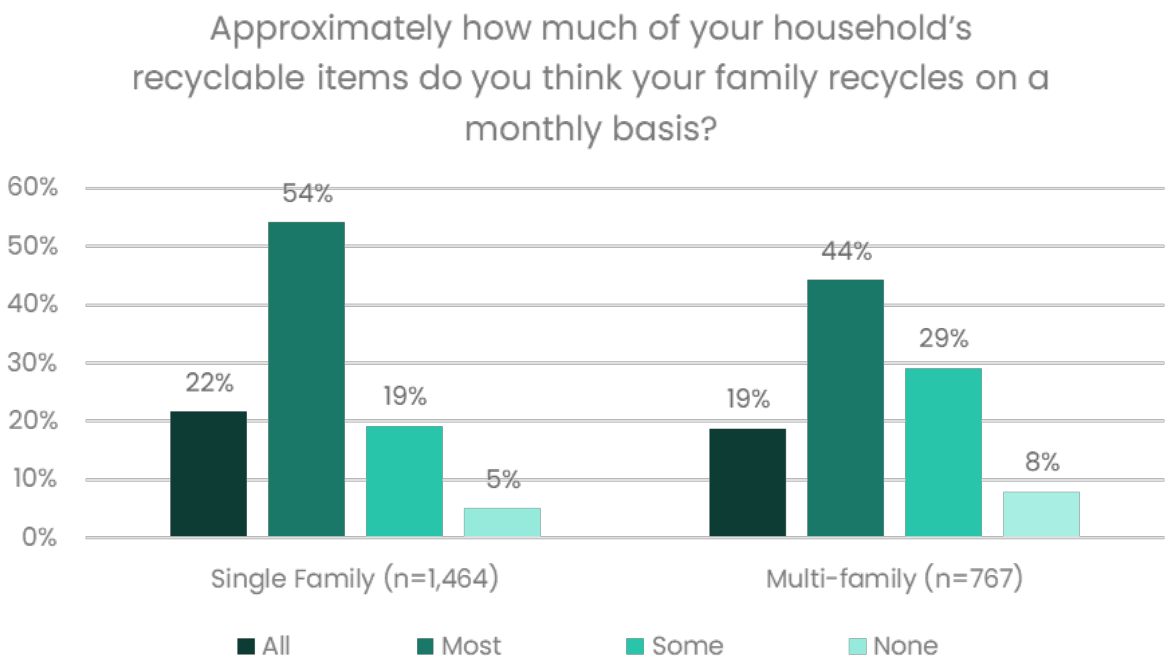


Table 61 displays the responses of residents in multi-family homes to questions about their current and intended recycling behavior. Responses are displayed for both the overall sample and by key segments. Rural residents are less likely than others to report current building bin availability (47% versus 76% Urban and 72% Suburban). The Central region (51%) has the lowest rates of current multi-family bin availability, followed by the Eastern (66%), and the Western regions (79%), with the Western having the highest rate. Among those multi-family residents without bins at their buildings, 53% bring their recycling products to a drop-off location or transfer station. Those in the Eastern part of the State have the lowest rates of drop-off (42%).

Most multi-family residents without current bin availability (73%) would participate in recycling if it were available to them at their building for free. Central residents (80%) are more likely than Western (70%) or Eastern (72%) residents to indicate willingness to participate. BIPOC residents were less likely (64%) than White (76%) or Hispanic/Latino/Latina/Latinx (81%) to indicate they would participate.

Table 61: Multi-Family Recycling Experience by Segment

Segment		Does your building or complex provide a bin for recycling?		Do you drop off your recycling at a recycling drop-off location or transfer station? (Among No or Not Sure to Recycle at House)		Would you participate in recycling if it was available at your building or complex and was free of charge? (Among No or Not Sure to Recycle at House)	
		Number of Respondents	% Yes	Number of Respondents	% Yes	Number of Respondents	% Yes
Overall		767	71%	219	53%	219	73%
Community Type	Urban	395	76%	95	55%	95	75%
	Suburban	297	72%	84	50%	84	73%
	Rural	75	47%	40	53%	40	68%
Geographic Region	Western	442	79%	94	59%	94	70%
	Central	90	51%	44	59%	44	80%
	Eastern	235	66%	81	42%	81	72%
Ethnicity	White	387	66%	130	52%	130	76%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	137	81%	26	50%	26	81%
	BIPOC (excluding Hispanic/Latino/Latina/Latinx)	221	72%	61	57%	61	64%

A.2.3 Recycling/Waste Reduction Attitudes

Recycling is important to about three quarters (76%) of residents (42% very important and 34% important in Figure 23). Motivations for recycling are many and varied. Figure 24 shows that about six in 10 respondents recycle because it is the right thing to do (61%) or to keep recyclables out of landfills (60%). Over half recycle to conserve natural resources (55%) or to reduce pollution (55%). Respondents were least likely to agree that they recycle because it helps them have a smaller trash can (28%). Figure 25 shows that two-thirds (66%) of respondents are confident that they are recycling items correctly in their bin.

Figure 23: Importance of Recycling

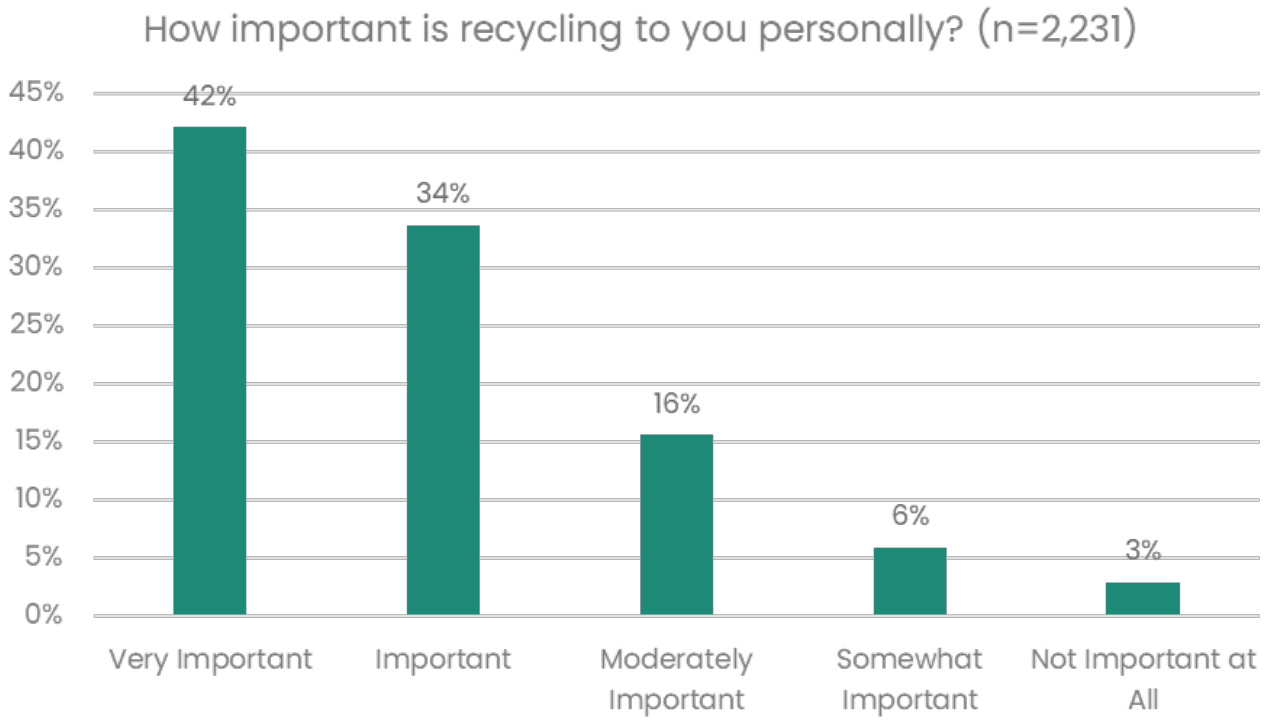


Figure 24: Motivations for Recycling

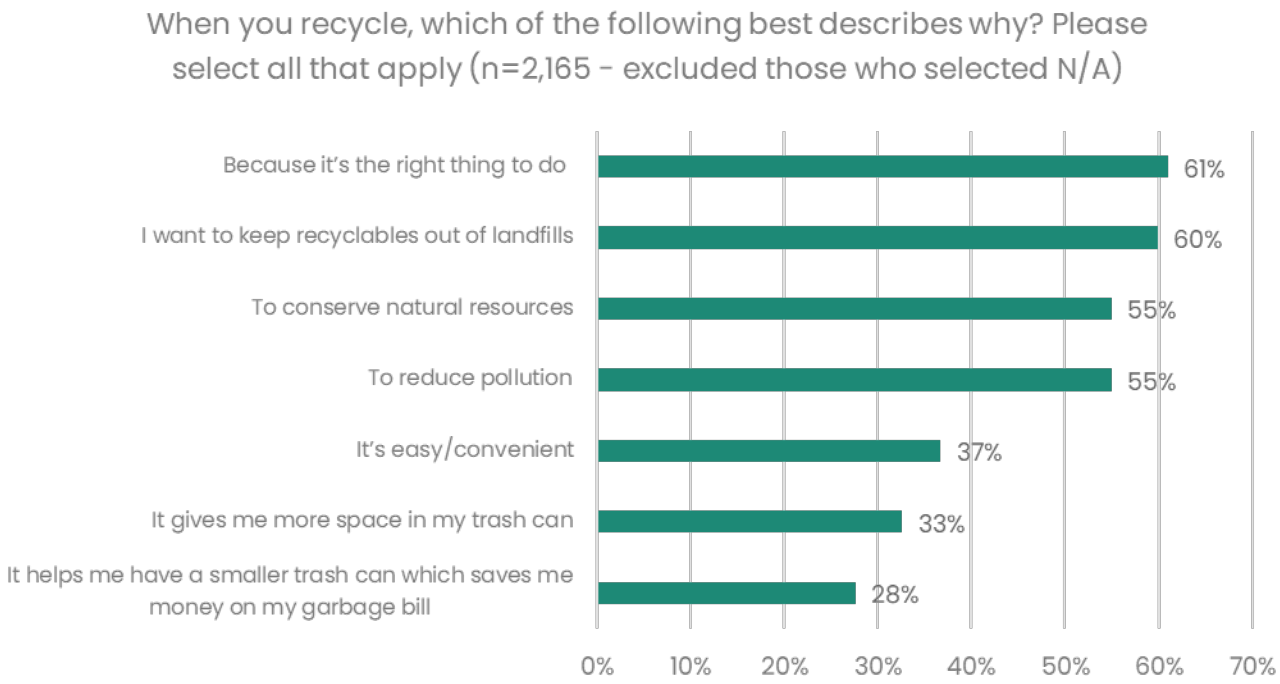


Figure 25: Confidence in Recycling Correctly

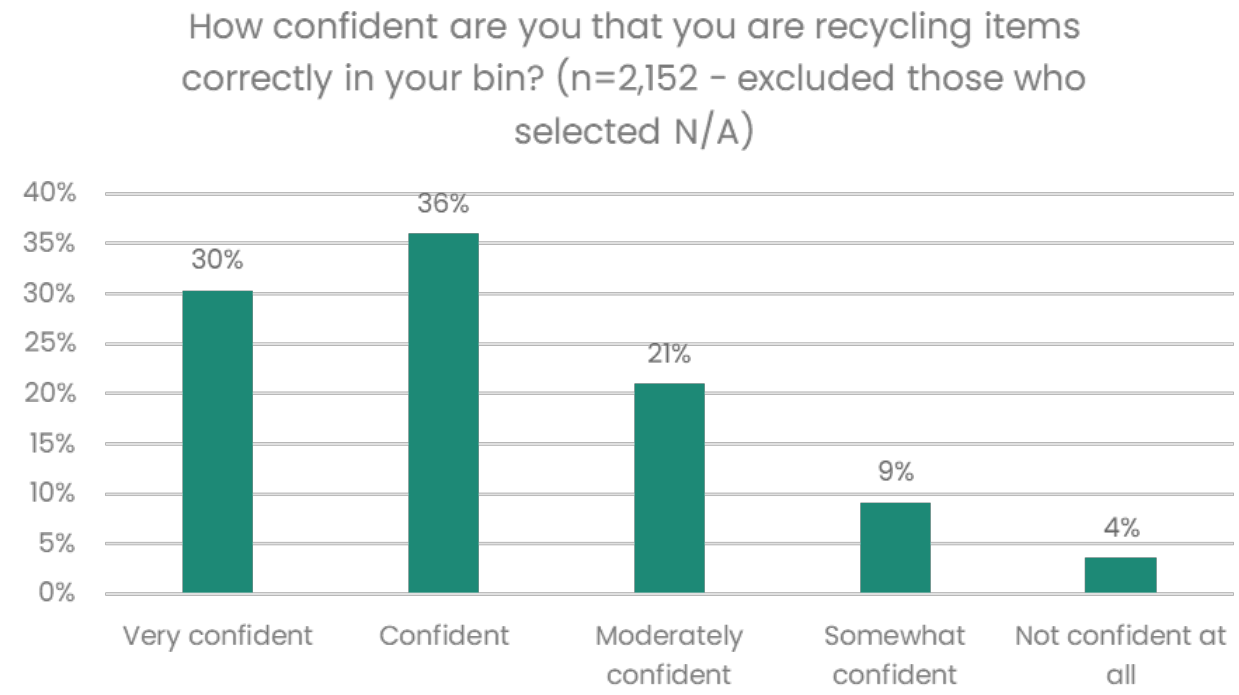


Table 60 displays the combined percentages of those rating recycling as "very important" or "important" to them personally. Responses are displayed for both the overall sample and by key segments. Most residents (76%) feel recycling is important to them. There are consistently strong ratings across residence and community type, geographic region, and ethnicity. Current recycling status, unsurprisingly, does have some influence on this rating, with those currently participating in curbside or building recycling programs selecting the highest rates of importance (80%).

Table 60 also shows that about 64% of Washington residents have good confidence that they are recycling correctly. Again, this confidence is relatively stable across residence and community type, geographic region, and ethnicity. Those currently participating in curbside or building recycling programs have the highest rates of confidence that they are recycling correctly (68%).

Table 60: Importance of Recycling and Confidence in Recycling by Segment

		Number of Respondents	Recycling Importance (% "Very Important" or "Important")	Confidence Recycle Correctly (% "Very Confident" or "Confident")
Overall		2,231	76%	64%
Residence Type	Single-family	1464	78%	66%
	Multi-family	767	71%	60%
Community Type	Urban	871	76%	64%
	Suburban	934	75%	63%
	Rural	426	76%	67%
Geographic Region	Western	1128	75%	66%
	Central	317	78%	63%
	Eastern	786	75%	61%
Ethnicity	White	1359	76%	66%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	308	78%	61%
	BIPOC (excluding Hispanic/Latino/Latina/Latinx)	492	74%	59%
Recycling Status	Currently has curbside/building recycling service	1546	80%	68%
	Curbside recycling available but has declined service (single-family)	91	63%	55%
	No curbside/building recycling service available	440	69%	57%
	Unsure of whether curbside/building recycling available	154	58%	44%

A.2.4 Recycling Satisfaction

Figure 26 shows the reported consistency of recycling among both single-family and multi-family residents. While close to nine in 10 single-family residents (87%) feel that their recycling service is consistent, three quarters of those in multi-family units (75%) feel the same. Figure 27 shows that both single-family and multi-family residents rate affordability weakest among the four satisfaction dimensions rated (63% and 64% respectively). Figure 39 indicates that both populations also feel that recycling is easy to understand (76% of single-family residents and 72% of multi-family residents). However, single-family residents are more likely to agree that recycling is convenient (83%) than are multi-family residents (70%), as shown in Figure 40.

Figure 26: Consistency of Recycling

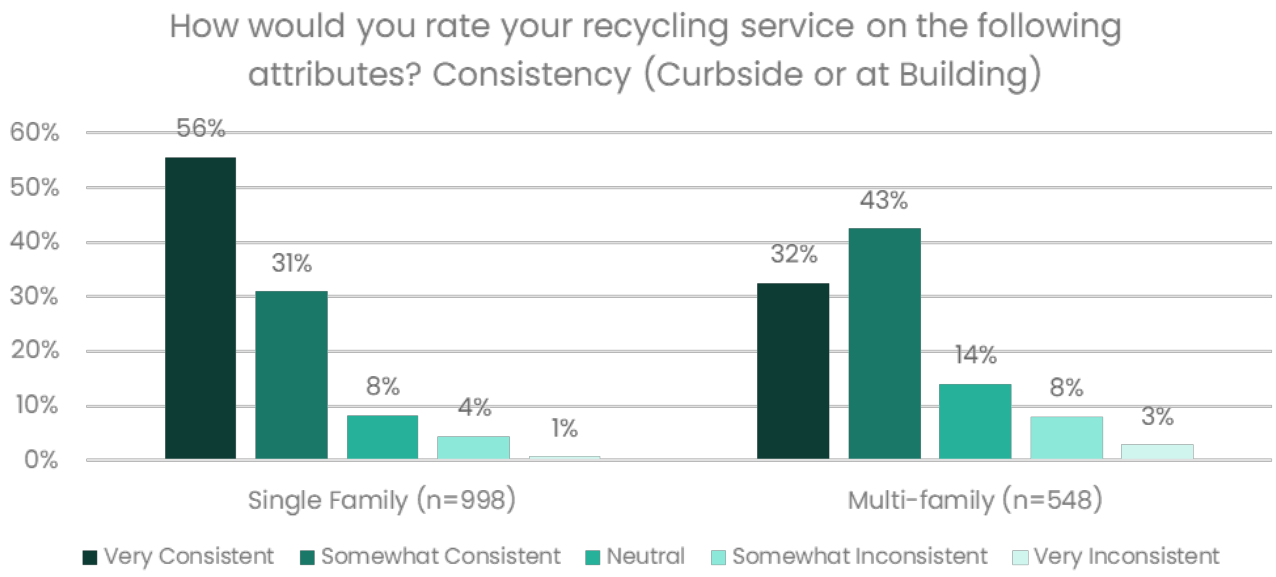


Figure 27: Affordability of Recycling

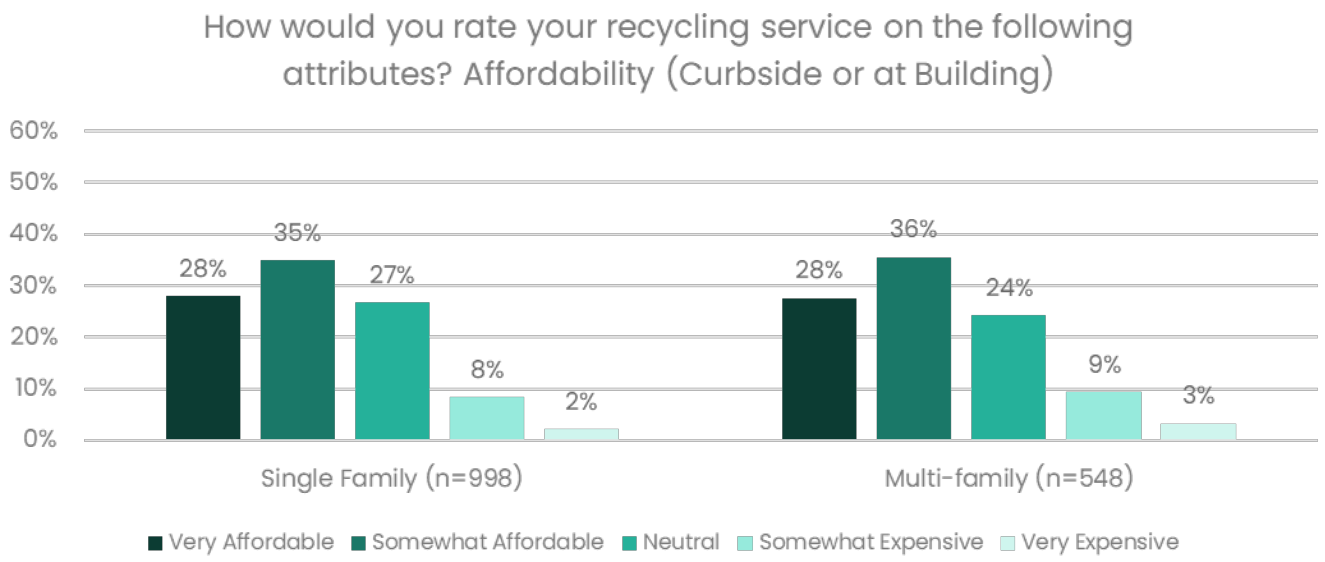


Figure 28: Ease of Understanding of Recycling

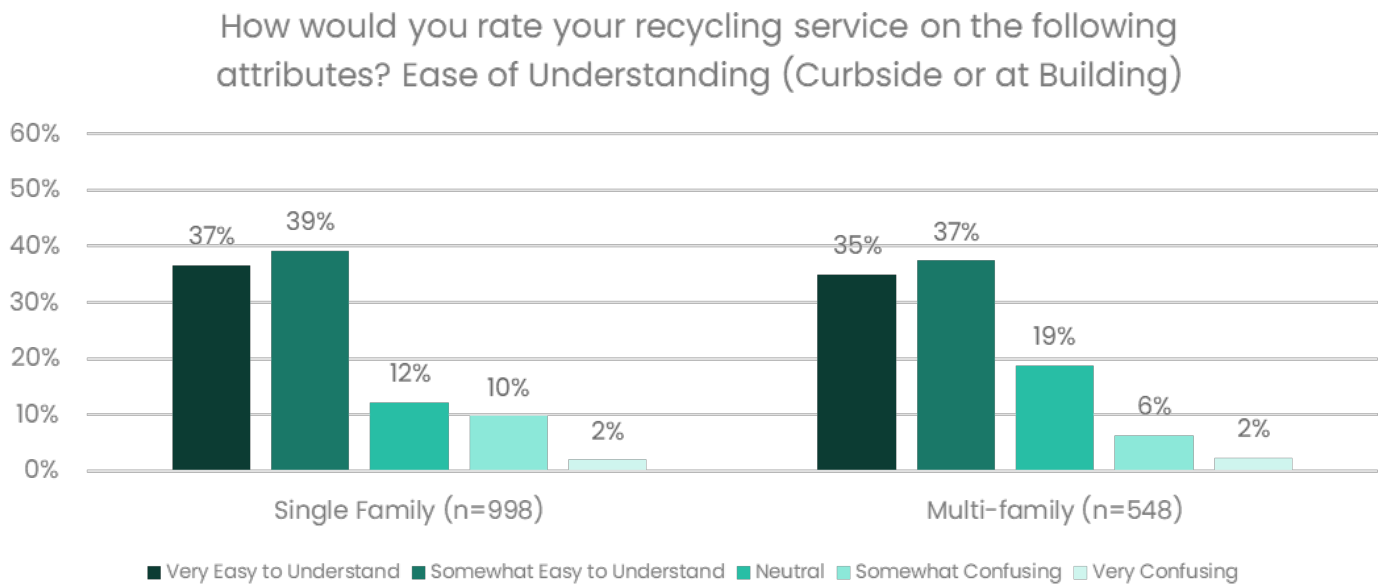


Figure 29: Convenience of Recycling

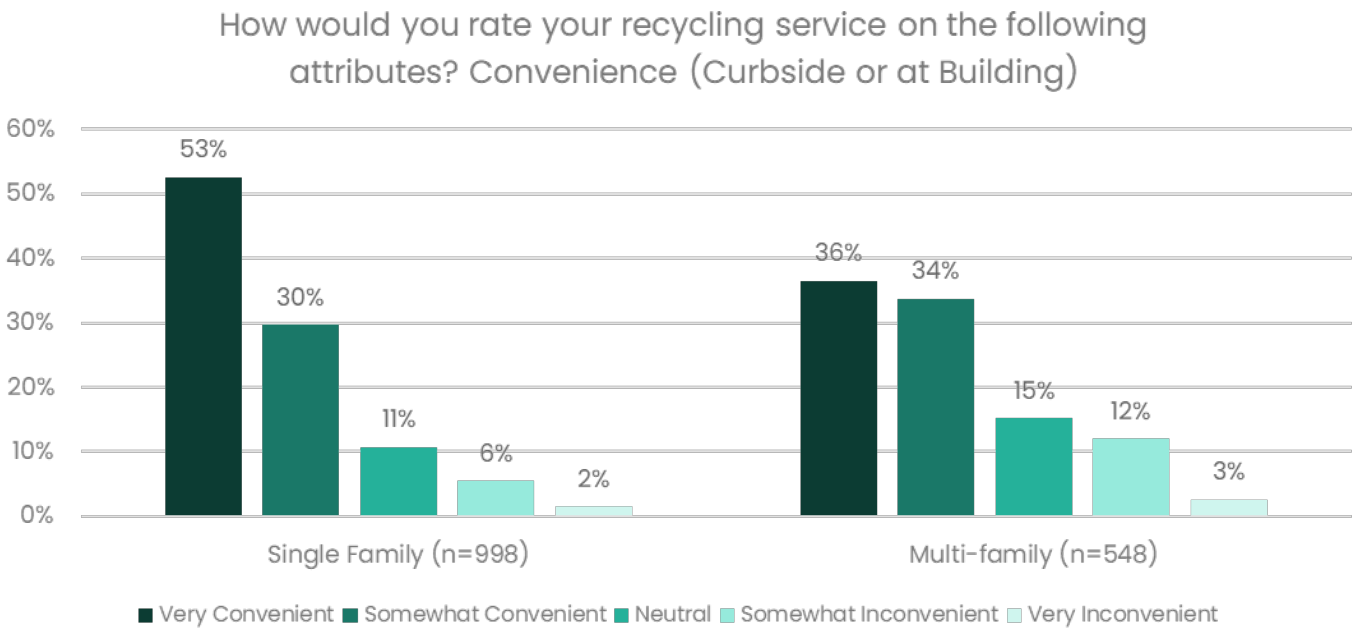


Table 61 displays residents' satisfaction with their current recycling situation. Responses are displayed for both the overall sample and by key segments. Residents are most likely to agree that their current situation is consistent (82%) and least likely to feel that it is affordable (63%).

Those living in single-family homes are more likely than those in multi-family homes to believe that their current recycling service is consistent (87% versus 75%) and convenient (82% versus 70%). Meanwhile, those in the Western part of the State are more likely to feel that the current situation is easy to understand (77%) than those in the Central region (68%). Those in the Eastern region are more likely to agree that it is convenient (80%) than those in the Central region (66%).

Finally, BIPOC residents are less likely to feel that the current situation is convenient (66%) than those who are White (82%) or Hispanic or Latino/Latina/Latinx (84%).

Table 61: Satisfaction with Current Recycling by Segment

Segment		Number of Respondents	Consistency (% "Very Consistent" or "Somewhat Consistent")	Affordability (% "Very Affordable" or "Somewhat Affordable")	Ease of Understanding (% "Easy to Understand" or "Somewhat Easy to Understand")	Convenience (% "Very Convenient" or "Somewhat Convenient")
Overall		1,546	82%	63%	75%	78%
Residence Type	Single-family	998	87%	63%	76%	82%
	Multi-family	548	75%	63%	72%	70%
Community Type	Urban	670	79%	62%	73%	77%
	Suburban	731	84%	65%	77%	79%
	Rural	145	88%	60%	70%	77%
Geographic Region	Western	908	83%	63%	77%	78%
	Central	108	76%	59%	68%	66%

	Eastern	530	83%	63%	72%	80%
Ethnicity	White	911	84%	66%	76%	82%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	238	78%	61%	74%	84%
	BIPOC (excluding Hispanic/Latino/ Latina/Latinx)	349	82%	60%	72%	66%

As Figure 30 indicates, respondents identify a variety of challenges to recycling at home. The inability to recycle certain items in their community (30%), variations in what can be recycled (27%), and uncertainty about what can be recycled (25%) are the most common challenges identified. Only 13%, however, indicate that recycling is not available in their area. Meanwhile, Figure 31 indicates that the most common challenge to recycling on the go, by close to half of respondents (48%), is the lack of availability of public recycling bins.

There is also some question among respondents whether the items placed in recycling bins are actually recycled. As seen in Figure 32, only about four in 10 (39%) are confident that this is happening.

Figure 30: Challenges in Recycling at Home

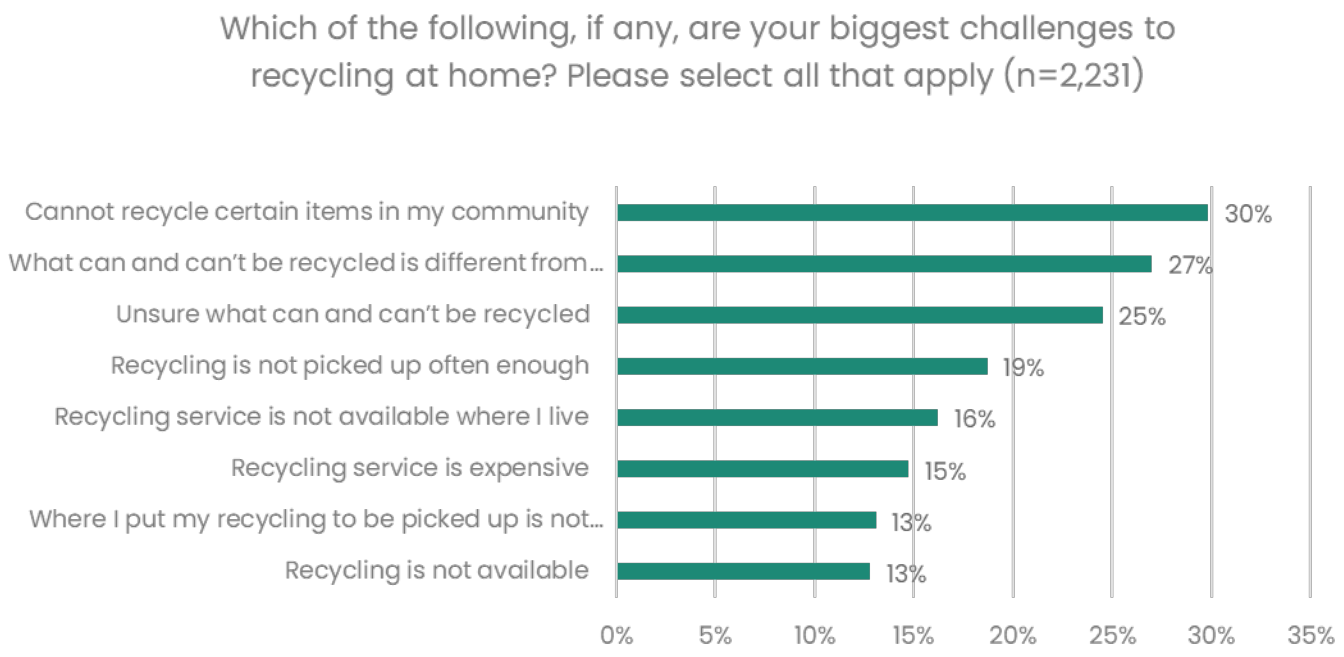


Figure 31: Recycling On the Go

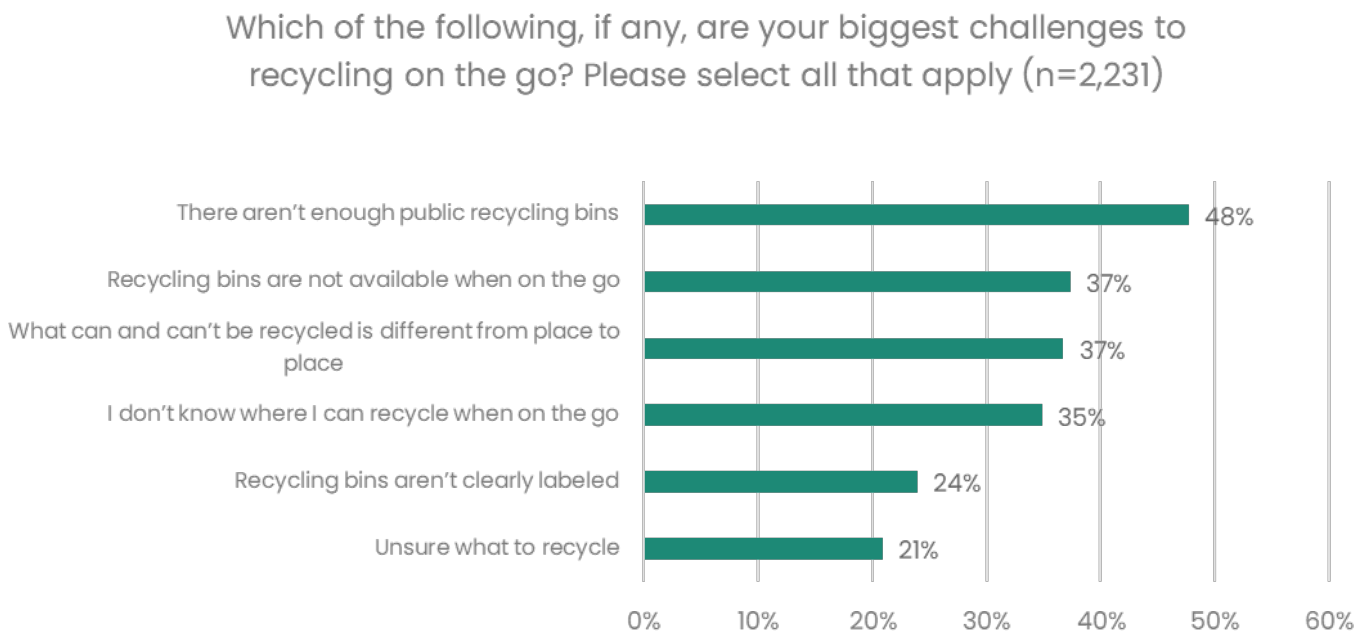
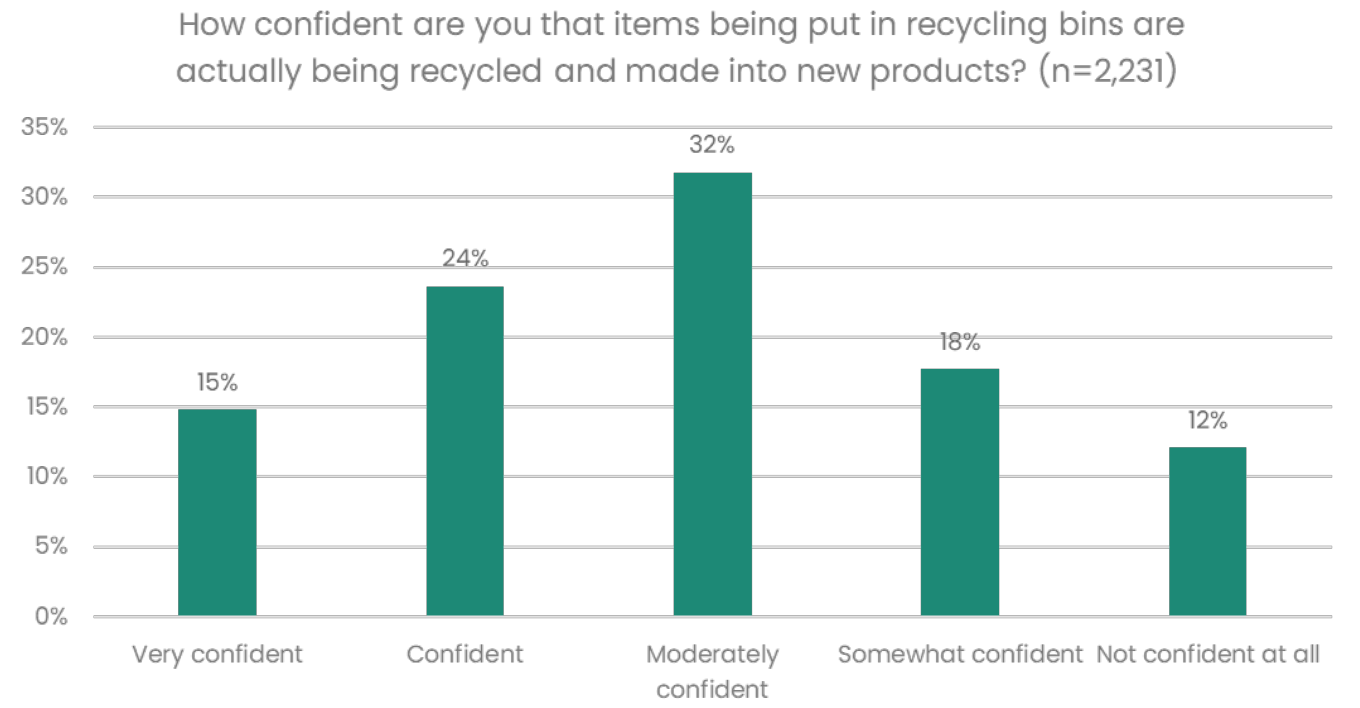


Figure 32: Confidence in Items Being Recycled into New Products



A.2.5 Recycling System

As seen in Figure 33, close to nine in 10 respondents (87%) agree that everyone in the State of Washington should have access to convenient recycling options. Figure 34 shows that about the same number (86%) feel that reducing waste is important. Figure 35 shows that about eight in 10 (81%) agree that everyone in Washington should be able to recycle the same items, regardless of location. Figure 36 shows that the same proportion (79%) also agree that recycling should be free for everyone.

Figure 33: Agreement with Access to Recycling

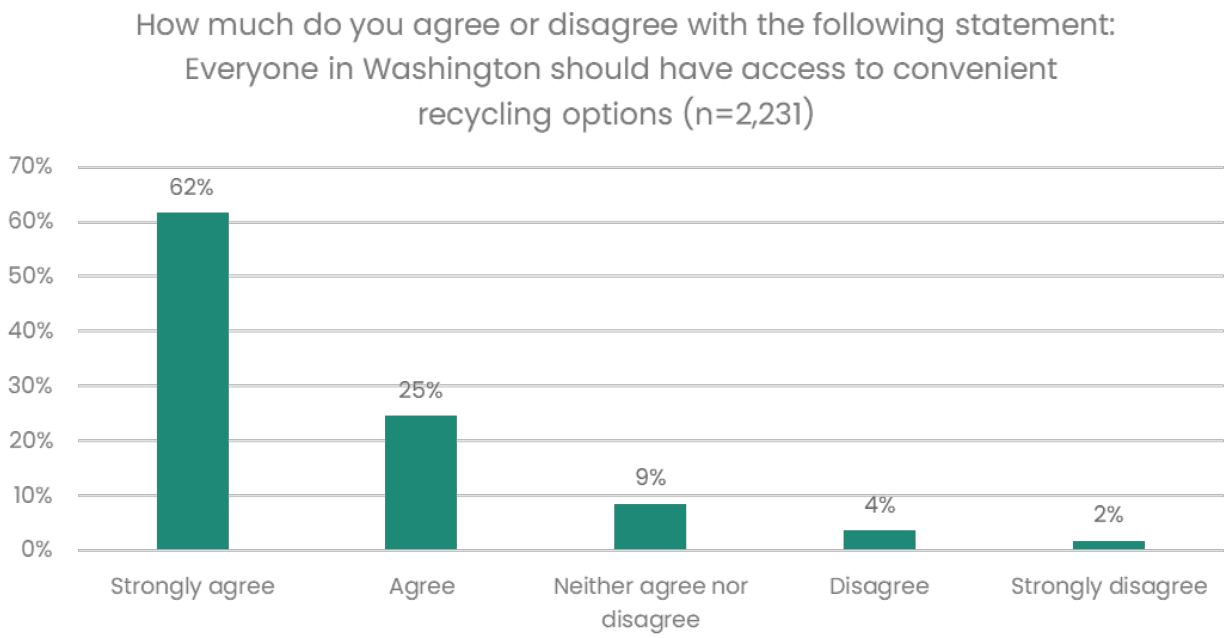


Figure 34: Agreement with Importance of Reducing Waste

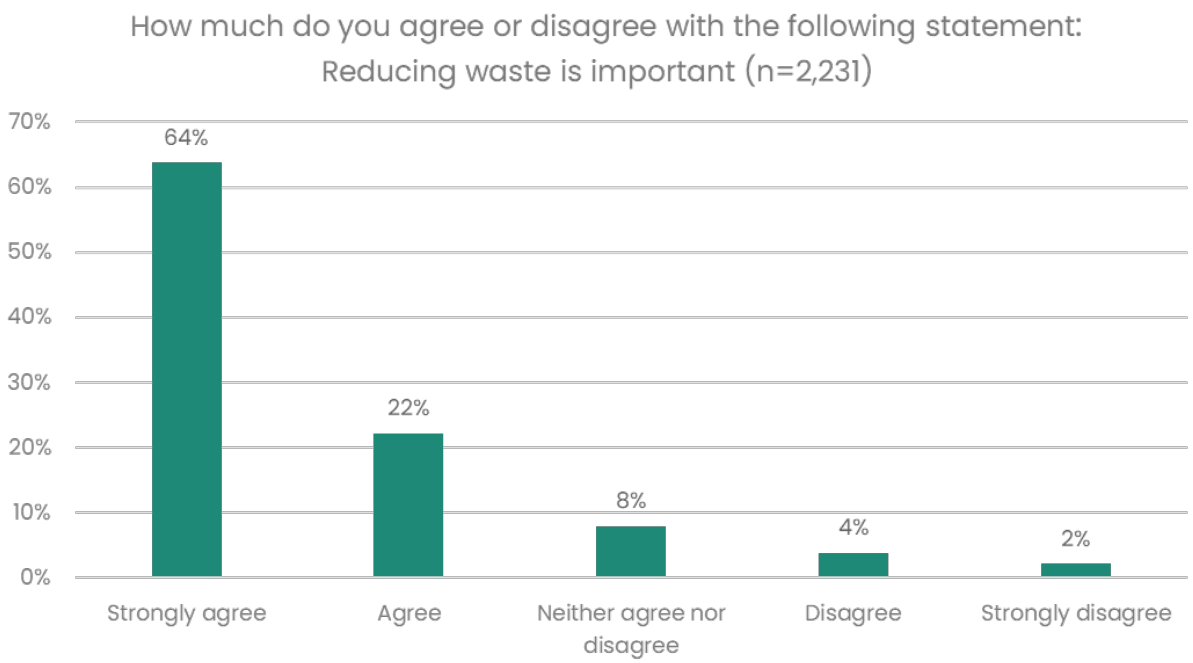


Figure 35: Agreement with Consistent Standards for Recycling

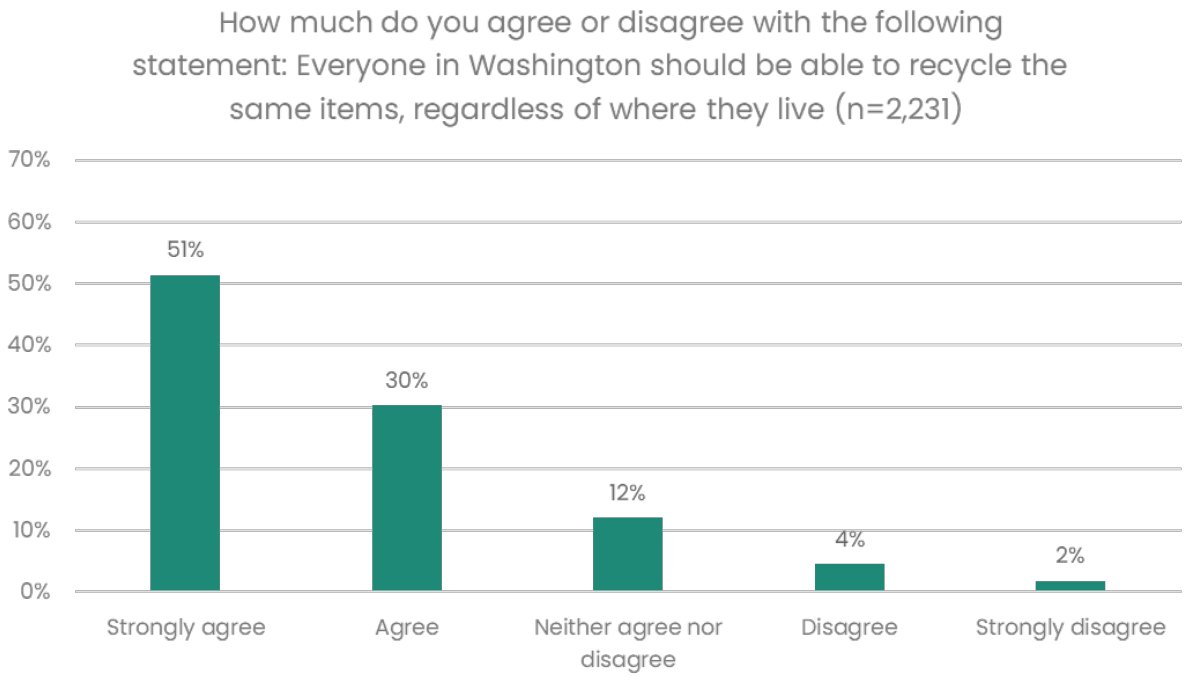


Figure 36: Agreement with Importance of Free Recycling

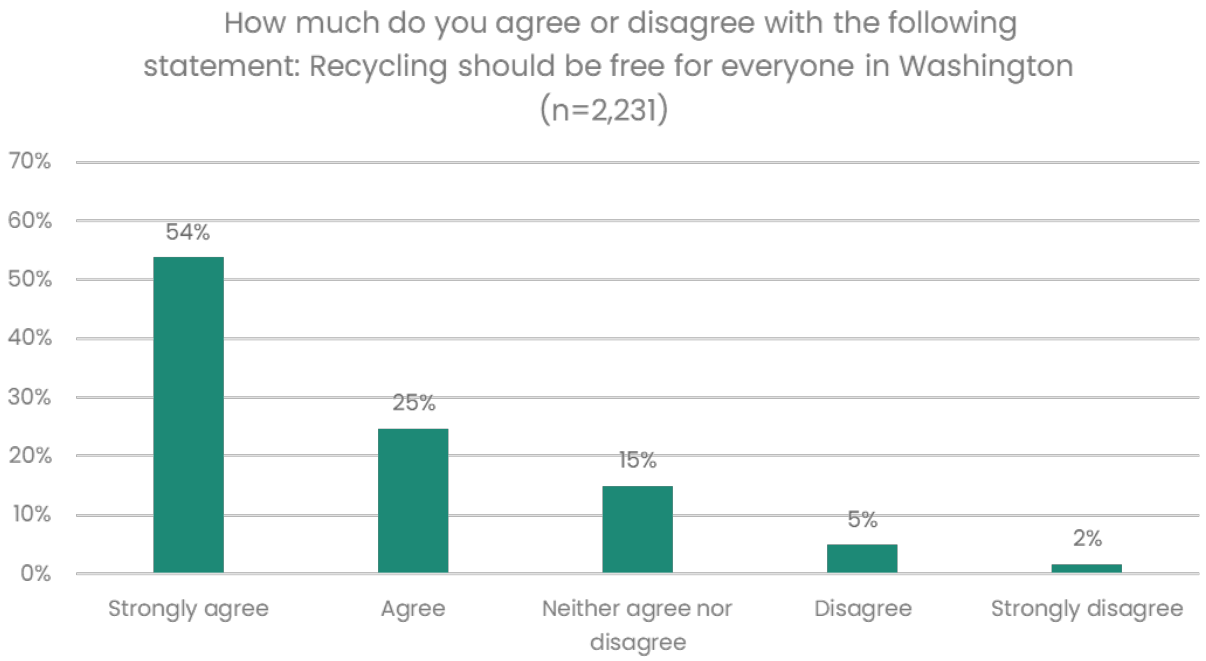


Table 62 displays the combined percentages of those selecting "strongly agree" or "agree" on several items concerning recycling values. Most residents agree (78% to 86%) with all four statements. The importance of access to convenient recycling options (86%) and the importance of reducing waste (86%) receive the highest levels of agreement.

These statements receive consistently strong agreement ratings across residence and community type, geographic region, ethnicity, and recycling status. However, those living in single-family homes do tend to rate the importance of these for items higher than those living in multi-family units. This is particularly true for the question "Reducing waste is important" (89% versus 79%). BIPOC residents (excluding Hispanic/Latino/Latina/Latinx) also tend to agree with all four of these statements less than do other groups. Interestingly, those who are unsure about the status of their building/home's recycling status also have lower agreement levels about the importance of these four items. They are particularly unlikely to agree with the statement that recycling should be free for everyone in Washington (70%).

Table 62: Recycling Values by Segment

Segment	Number of Respondents	Recycling should be free for everyone in Washington (% "Strongly Agree" or "Agree")	Everyone in Washington should be able to recycle the same items, regardless of where they live (% "Strongly Agree" or "Agree")	Everyone in Washington should have access to convenient recycling options (% "Strongly Agree" or "Agree")	Reducing waste is important (% "Strongly Agree" or "Agree")
Overall	2,231	78%	82%	86%	86%
Single-family	1464	81%	84%	89%	89%

Residence Type	Multi-family	767	74%	77%	80%	79%
Community Type	Urban	871	78%	79%	84%	84%
	Suburban	934	77%	82%	87%	86%
	Rural	426	82%	86%	90%	90%
Geographic Region	Western	1128	78%	81%	85%	85%
	Central	317	79%	79%	85%	86%
	Eastern	786	79%	83%	88%	87%
Ethnicity	White	1359	82%	85%	89%	89%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	308	83%	81%	89%	88%
	BIPOC (excluding Hispanic/Latino/Latina/ Latinx)	492	70%	73%	78%	79%
Recycling Status	Currently has curbside/building recycling service	1546	79%	83%	88%	88%
	Curbside recycling available but has declined service (single-family)	91	79%	75%	80%	81%
	No curbside/building recycling service available	440	82%	83%	85%	85%
	Unsure of whether curbside/building recycling available	154	63%	71%	71%	68%

A.2.6 Extended Producer Responsibility

Respondents also generally agreed with the concept of producer responsibility. Figure 37 shows that close to eight in 10 respondents (85%) agreed that companies should design products that are easily recyclable. As seen in Figure 38, about the same proportion (83%) agree that companies should design product packaging using the least amount of material possible. Figure 39 shows that close to eight in 10 (78%) agree that companies should include recycled content in their packaging to ensure recyclables are made into new things.

Figure 40 shows that over seven in 10 respondents (72%) agree that companies should take responsibility for recycling the packaging of their products. As seen in Figure 41, about two thirds (67%) agree that companies should pay for the necessary recycling programs for their packaging.

Figure 37: Agreement with Corporate Responsibility for Product Design to Facilitate Recycling

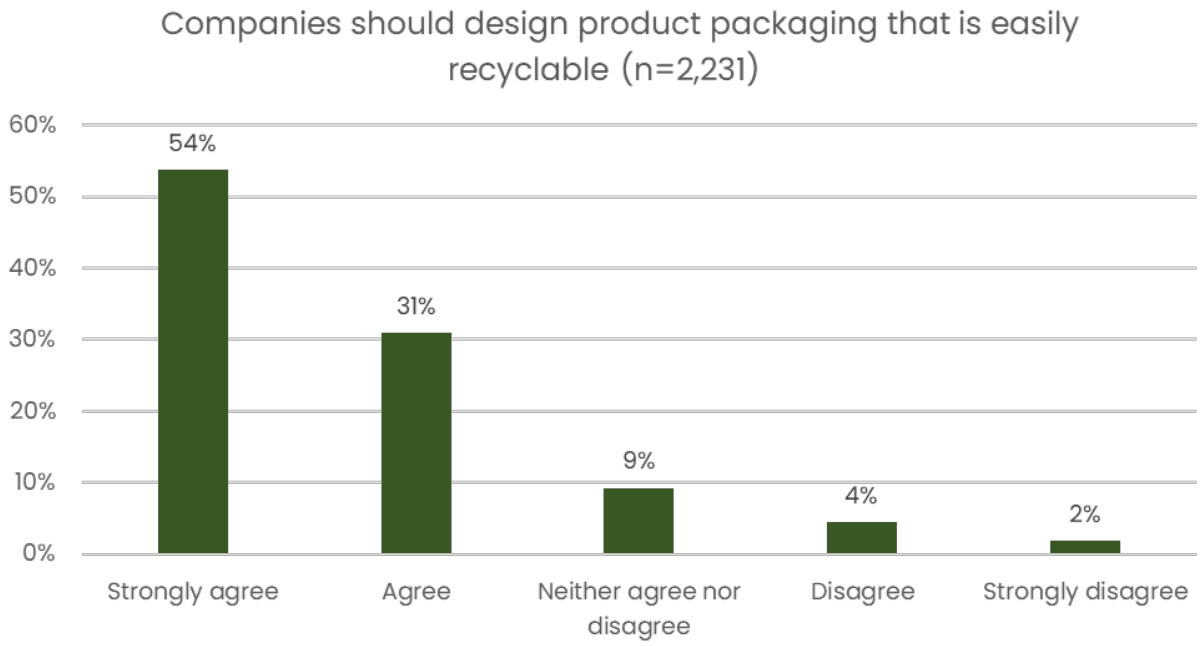


Figure 38: Agreement with Corporate Responsibility for Product Design to Reduce Waste

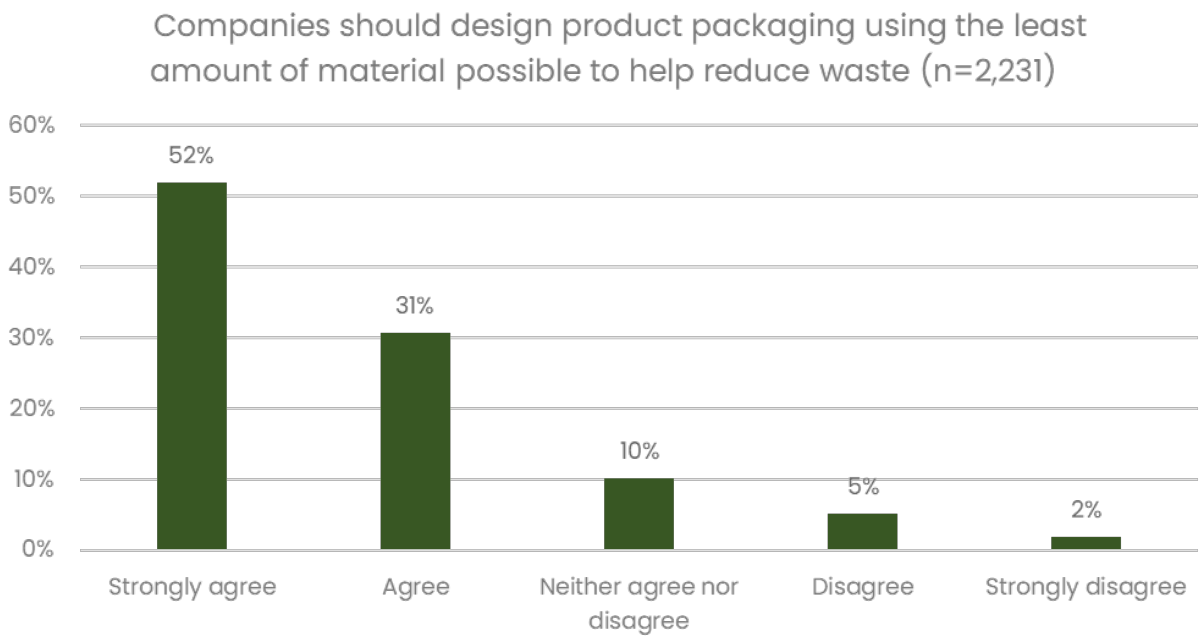


Figure 39: Agreement with Corporate Responsibility for Including Recycled Content in Packaging

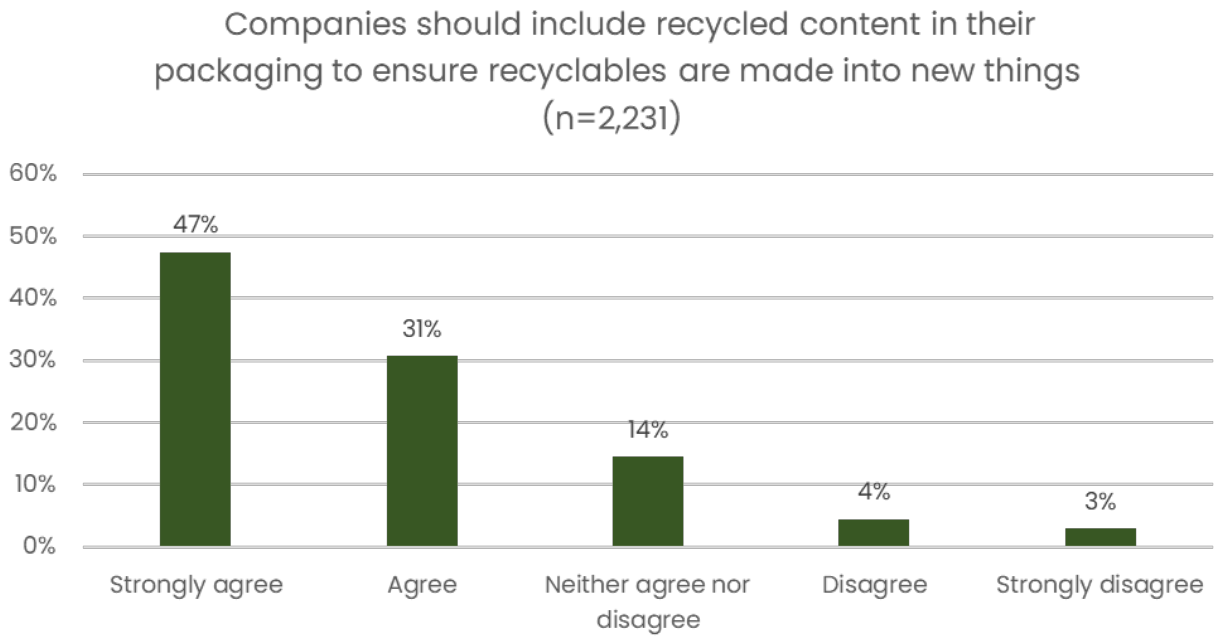


Figure 40: Agreement with Corporate Responsibility for Recycling Their Packaging

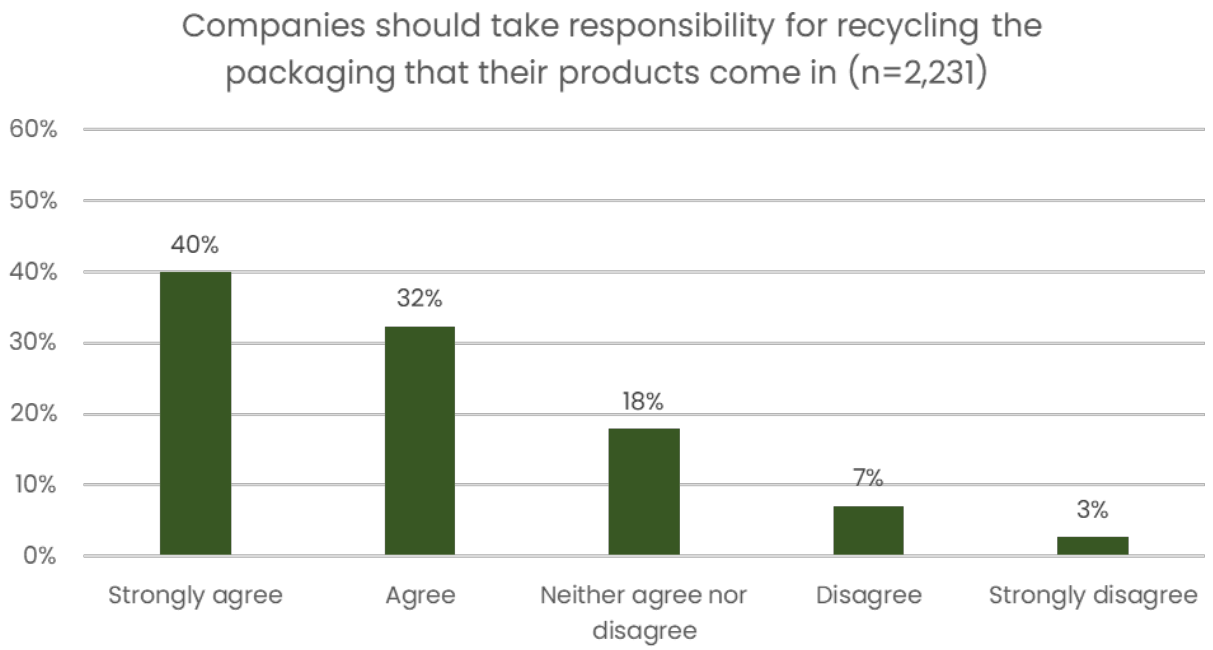


Figure 41: Agreement with Corporate Responsibility for Paying for Recycling Systems That Allow Packaging to Be Easily Recycled

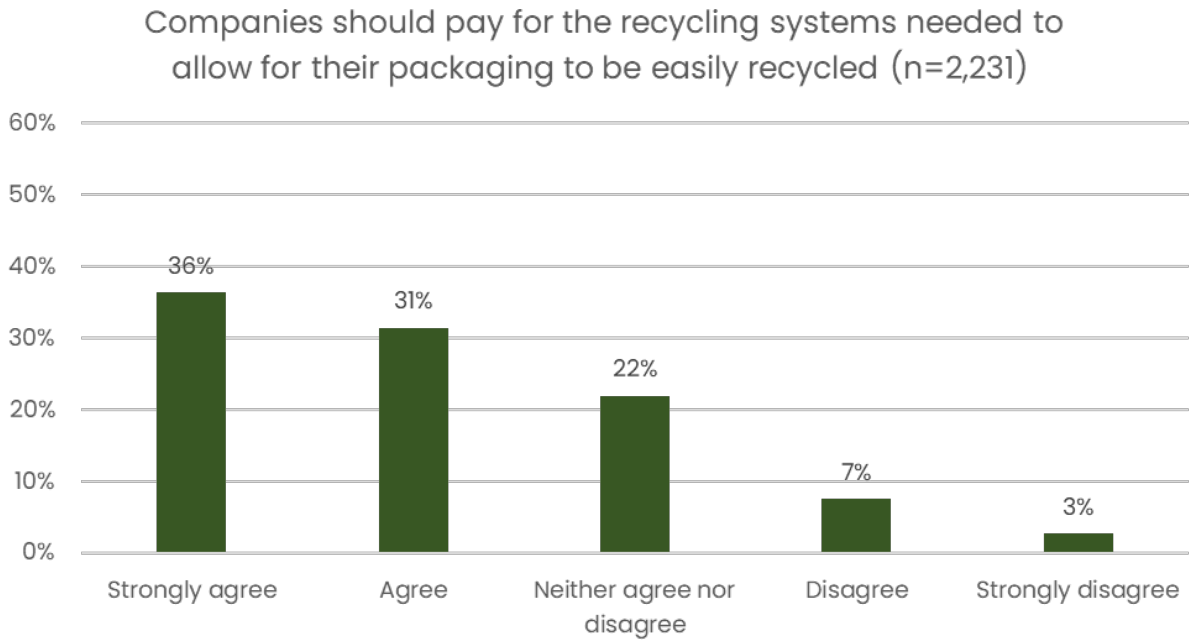


Table 62 shows residents' opinions about various levels of corporate responsibility. Residents were most likely to agree that companies should design packaging that is easily recyclable (85%) and that packaging should use the least amount of material possible (83%). They were somewhat less likely to agree that companies should pay for recycling systems necessary to allow their packaging to be easily recycled (68%).

Those in single-family homes were generally more likely to agree with these statements than were those in multi-family homes. Those in Rural areas were more likely than those in Urban areas to agree that companies should design packaging that is easily recyclable (90% versus 81%) and that packaging should use the least amount of material possible (89% versus 78%).

Table 62 also shows that Hispanic or Latino/Latina/Latinx residents are more likely than others to agree that companies should take responsibility for recycling their product packaging (81% versus 73% White and 69% BIPOC). They were also more likely than others to agree that companies should pay for the recycling systems necessary to allow their packaging to be easily recycled (80% versus 67% White and 65% BIPOC).

Those unsure whether their building has curbside recycling available were generally less likely to agree with the statements listed in Table 62.

Table 62: Corporate Responsibility by Segment

Segment		Number of Respondents	Companies should design product packaging that is easily recyclable (% "Strongly Agree" or "Agree")	Companies should take responsibility for recycling the packaging for their products (% "Strongly Agree" or "Agree")	Companies should pay for the recycling systems needed to allow for their packaging to be easily recycled (% "Strongly Agree" or "Agree")	Companies should include recycled content in their packaging to ensure recyclables are made into new things (% "Strongly Agree" or "Agree")	Companies should design product packaging using the least amount of material possible to help reduce waste (% "Strongly Agree" or "Agree")
Overall		2,231	85%	72%	68%	78%	83%
Residence Type	Single-family	1464	88%	74%	68%	81%	85%
	Multi-family	767	78%	69%	67%	73%	78%
Community Type	Urban	871	81%	72%	72%	77%	78%
	Suburban	934	85%	72%	65%	79%	84%
	Rural	426	90%	73%	65%	79%	89%
Geographic Region	Western	1128	83%	72%	68%	77%	81%
	Central	317	84%	72%	67%	78%	85%
	Eastern	786	87%	73%	68%	80%	84%
Ethnicity	White	1359	87%	73%	67%	80%	86%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	308	88%	81%	80%	82%	85%
	BIPOC (excluding Hispanic/Latino/Latina/Latinx)	492	78%	69%	65%	72%	74%
Recycling Status	Currently has curbside/building recycling service	1546	87%	73%	70%	81%	85%
	Curbside recycling available but has declined service (single-family)	91	77%	73%	64%	76%	71%
	No curbside/building recycling service available	440	85%	71%	65%	74%	82%
	Unsure of whether curbside/building recycling available	154	69%	65%	59%	68%	71%

A.2.7 Beverage Container Deposit Program

Respondents generally support the concept of a DRS (referred to as a beverage container deposit program in the survey). Figure 42 shows that seven in 10 (70%) respondents indicate that they are likely to return beverage containers were the described beverage container deposit program available in their community. As shown in Figure 43, there are a variety of reasons that they would participate. The most common reason identified was to receive their deposit back (42%).

Figure 44 indicates that the top reasons that respondents would not participate in such a program are that it would be easier to put the bottles in the bin at home (35%) and that it would take too much time to take the bottles to the return center (33%).

Meanwhile, Figure 45 indicates that close to a quarter of respondents (22%) believe that a 10 cent can deposit would have a significantly negative impact on them.

Figure 46 shows that close to two in 10 respondents (18%) would only be willing to travel less than a mile to return containers. Another quarter (24%) would travel one to two miles, and close to three in 10 (28%) would travel three to five miles.

Figure 42: Likelihood to Participate in Bottle Return Program

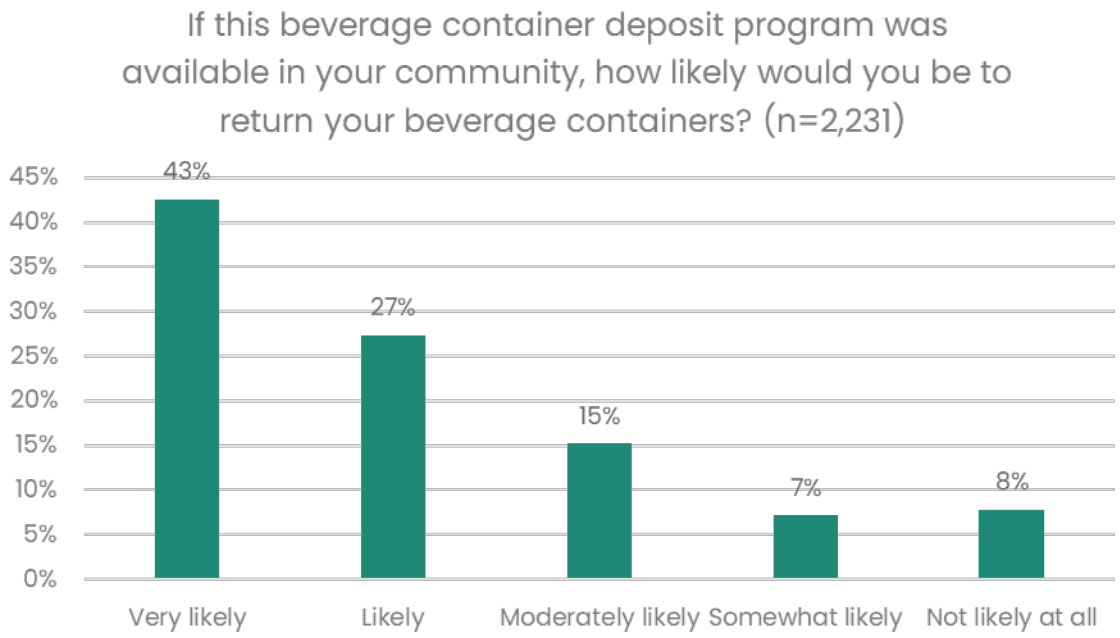


Figure 43: Reasons for Participating in Bottle Deposit Program

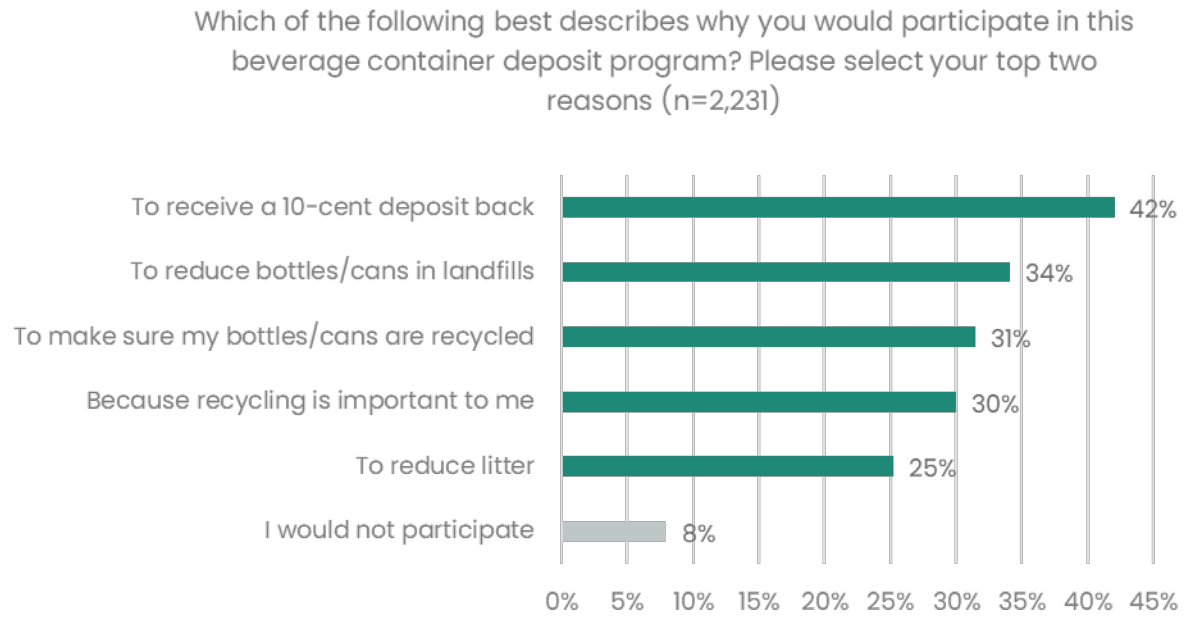


Figure 44: Reasons for Not Participating in Bottle Deposit Program

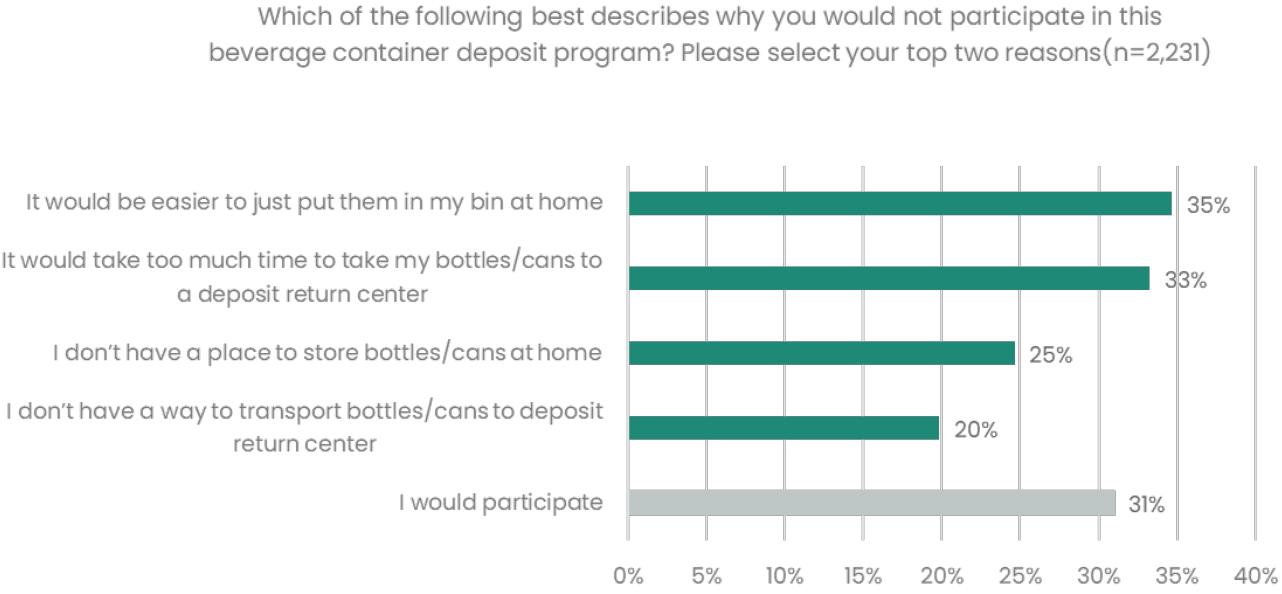


Figure 45: Impact of 10-cent Deposit

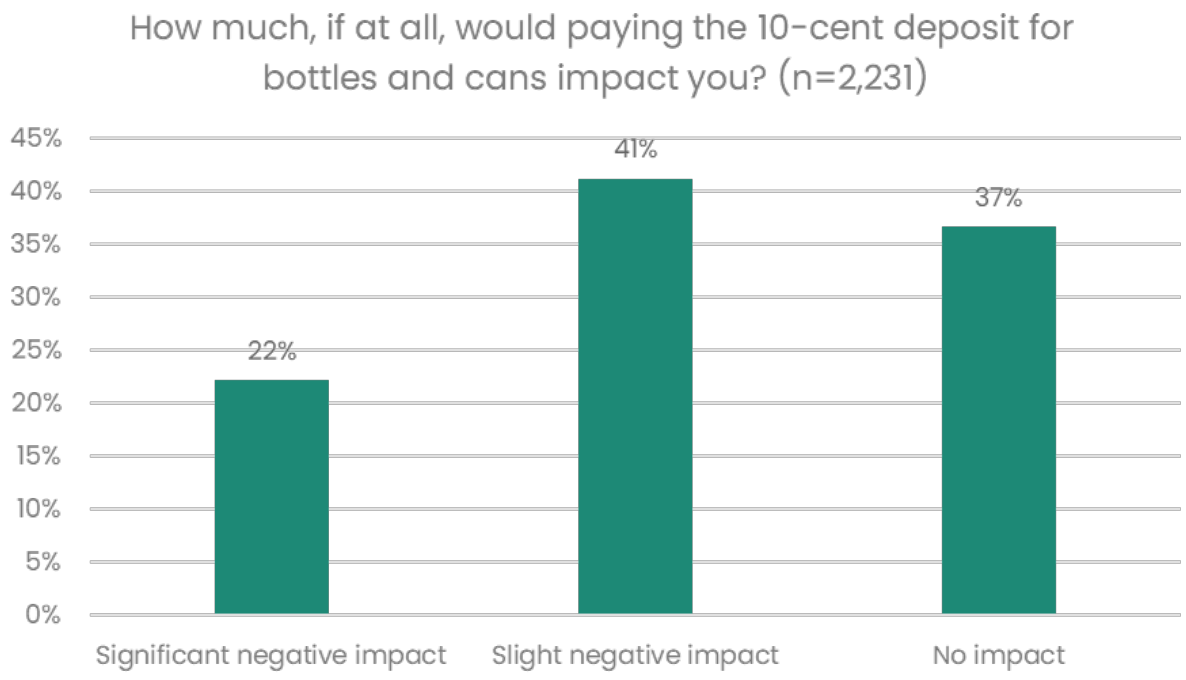


Figure 46: How Far Would Travel to Return Containers

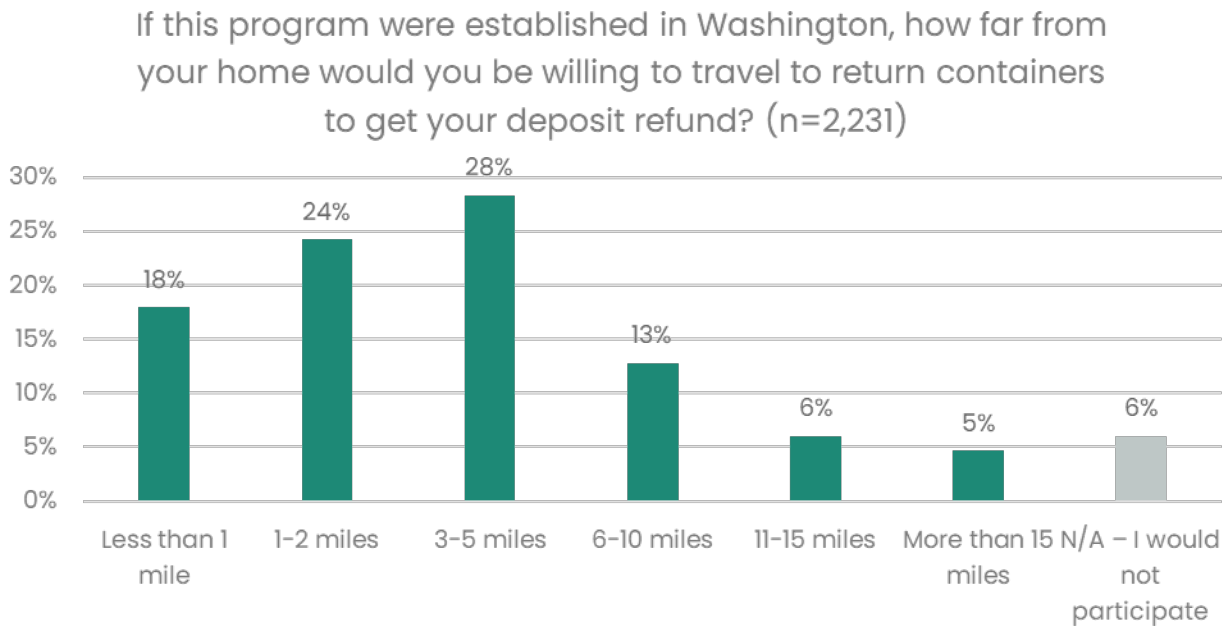


Table 63 details residents' responses to the proposed beverage container deposit program. Seven in 10 respondents (70%) indicated that they would return containers under the described program, while just over two in 10 (22%) felt that this program would significantly negatively impact them.

Those in rural communities were more likely to indicate that they would travel more than 10 miles to return containers (28% versus 6% Urban and 7% Suburban), as would those from the Central area of the State (23% versus 11% Eastern and 7% Western).

Table 63 also indicates that those who are unsure of the availability of recycling at their residence were least likely to agree that they would participate in the described program (59%), while those who have previously declined to participate in available recycling programs are more likely to feel that the described program would significantly negatively impact them (34%). However, six in 10 said it would have at least a slightly negative impact.

Table 63: Beverage Container Deposit Factors by Segment

Segment		Number of Respondents	If this beverage container deposit program were available in your community, how likely would you be to return your beverage containers? (% "Very likely" or "Likely")	How much, if at all, would paying the 10-cent deposit for bottles and cans impact you? (% "Significant negative impact")	If this program were established in Washington, how far from your home would you be willing to travel to return containers to get your deposit refund? (% More than 10 miles)
Overall		2,231	70%	22%	11%
Residence Type	Single-family	1464	70%	22%	12%
	Multi-family	767	69%	22%	8%
Community Type	Urban	871	70%	22%	6%
	Suburban	934	67%	23%	7%
	Rural	426	74%	22%	28%
Geographic Region	Western	1128	69%	23%	7%
	Central	317	75%	22%	23%
	Eastern	786	69%	20%	11%
Ethnicity	White	1359	70%	21%	11%
	Hispanic or Latino/Latina/Latinx Solely or Multiracial (including Hispanic or Latino/Latina/Latinx)	308	77%	21%	11%
	BIPOC (excluding Hispanic/Latino/Latina/Latinx)	492	66%	25%	9%
Recycling Status	Currently has curbside/building recycling service	1546	70%	22%	6%
	Curbside recycling available but has declined service (single-family)	91	74%	34%	14%
	No curbside/building recycling service available	440	73%	18%	24%
	Unsure of whether curbside/building recycling available	154	59%	29%	18%

Respondents were asked "What additional information, if any, would you like to know to determine whether you think a beverage container deposit program would be something you would support?" Some of the more commonly mentioned themes were:

- Concerns about cost (e.g., products already expensive before adding another 10 cents)
- Convenience (e.g., effort to take containers to recycling locations)
- Specific parameters of program (e.g., what will be included)
- Impacts of program (e.g., will it be funded by taxpayer money, how much would program help over current recycling programs)

- Public preparedness measures (e.g., what public information campaigns will be conducted to educate residents)

- Examples of successful similar programs in other regions/states

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