

Economic Analysis of a U.S. National Extended Producer Responsibility Framework

Technical Report

Prepared for SC Johnson & World Wildlife Fund

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Executive Summary

Expanding extended producer responsibility (EPR) under a harmonized national framework has the potential to deliver benefits across the economy, including a broader set of effects such as strengthening recycling systems; reducing costs to local governments and taxpayers; supporting investment in reuse, recycling, and end-market infrastructure; introducing efficiencies for producers; and creating jobs across communities.

Since 2021, seven U.S. states have adopted packaging EPR laws, and more states are considering legislation. As EPR expands, a practical policy question stands: will the United States build a coordinated system or a set of fragmented definitions, reporting requirements, timelines, and compliance rules?

This question matters because variation across state programs can reflect legitimate state priorities and local conditions. Even with fragmented state policies, desired circularity outcomes can still be achieved—yet excessive fragmentation creates costs and complexity that do not improve recycling, reuse, or waste-reduction outcomes.

RTI modeled the expansion of EPR across the United States under a hypothetical harmonized national framework for packaging to assess the economic significance of greater alignment and expansion. The analysis does not evaluate a specific bill or endorse a legislative proposal. It examines potential impacts on municipal budgets, infrastructure investment, jobs, producer compliance costs, and state-level economic activity.

The findings suggest that a harmonized framework could create producer efficiencies by reducing compliance costs and EPR expansion may introduce fiscal flexibility for local governments and support infrastructure-related jobs and economic activity.

What Is Extended Producer Responsibility (EPR)?

EPR is a policy approach that shifts financial and operational responsibility for packaging waste from local governments and taxpayers to producers, including helping fund the systems needed to collect, sort, reuse, recycle, and manage it after use.

For packaging EPR, producers typically pay fees through a producer responsibility organization (PRO), which funds activities like collection, recycling infrastructure, education, reporting, and end-market development.

EPR programs can use eco-modulated fees to create incentives for better packaging, meaning producers pay different rates based on packaging attributes such as recyclability, post-consumer recycled (PCR) content, or reuse potential.

What Is a National EPR Framework?

A national EPR framework provides a common foundation for state-led EPR implementation, including consistent definitions of covered materials, targets and methodologies, producer reporting requirements, transparency expectations, and accountability principles. It could establish metrics related to material efficiency including reduction, reuse/refill, recycled content, and recycling performance.

The goal of a harmonized national framework is to reduce inefficiencies of fragmented frameworks, improve visibility into outcomes, and provide a consistent foundation for state-led implementation while preserving state flexibility. It does not entail a one-size-fits-all program. States and local entities continue to define implementation to accommodate differences in recycling access, infrastructure, markets, and policy priorities.

What Is Included in the Modeled Framework?

This study assumes that EPR would expand across states under a national EPR framework that covers consumer packaging and paper, with limited exceptions, and applies to producers of covered products sold in the United States. Under the modeled framework, producers are assumed to fund the full net cost of managing covered materials, including collection, sorting, reuse, recycling, consumer education, enforcement, and end-market development. The modeled policy assumes a single, state-level producer responsibility organization (PRO) holds responsibility and that EPR would include eco-modulation design incentives to support reduced packaging and virgin material use over time, including improved recyclability, utilization of reuse/refill systems, reduction, and stronger end-markets for recycled materials. Importantly, these assumptions are used for economic modeling. They should not be read as a specific legislative proposal or statutory checklist.

This study seeks to explore broader impacts associated with EPR that are less established in the literature. Some potential outcomes of EPR implementation within a national framework were not quantified in this analysis because of limited data availability and the study's focus on jobs and recycling infrastructure investment. These include packaging optimization, introduction and expansion of reuse and refill systems, increased use of post-consumer recycled (PCR) content, and material use reduction.

Key Findings

Expanded EPR stimulates investment and supports economic activity.

$111B
Economic Value Added over 10 years

$9.5B
State and Local Tax Revenue over 10 years

108K+
jobs supported annually once recycling operations reach steady-state

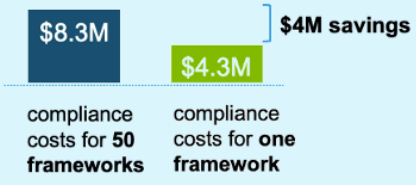


For every 1 job created by expanded EPR, 2 additional indirect or induced jobs are supported across the economy

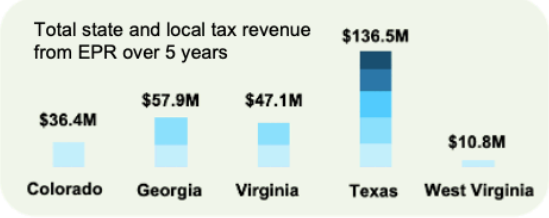
Expanded EPR generates fiscal flexibility for local tax governments.

49-53% reduction in annual waste management costs, including rural and urban localities

National EPR harmonization reduces producer compliance costs.



U.S. States can benefit from EPR jobs, activity, and recycling access.



Local governments could gain fiscal flexibility.
Case studies of municipal budget impacts suggest that EPR's shift to producer-funded systems could reduce annual waste management costs by roughly 49%–53% in urban and rural contexts. While these findings should not be interpreted as guaranteed tax reductions, they may provide fiscal flexibility for local governments, including the ability to delay future cost increases, improve service, or direct resources to other local priorities.

EPR-related investment could support jobs and economic activity.
Expanded EPR would require investment in recycling infrastructure, operations, education, and related system improvements. Under the modeled scenario, national EPR-related investment and implementation could contribute $111 billion in economic value added over 10 years and $9.5 billion in state and local tax revenue over 10 years.

Harmonization could reduce duplicative producer compliance costs.
As more states adopt EPR under different frameworks, producers may need to navigate different definitions, reporting systems, fee structures, timelines, and data requirements. Complying with an additional state that has unique EPR rules and definitions can increase producer compliance costs by an average of 94% more than complying under a more aligned framework. An average producer could spend approximately $4.3 million for a single year to comply with one uniformly defined policy across 50 states, compared with $8.3 million to comply with 50 unique state policies.

State-level impacts can be local and tangible.
State-level case studies demonstrate how expanded EPR implementation within a national framework could play out in different contexts. These cases demonstrate that impacts vary by baseline recycling rates, infrastructure needs, population, material flows, and market conditions. Where EPR is introduced, a national framework can provide alignment while still allowing implementation to reflect local realities.

Conclusion

As EPR advances within many states in the United States, a central policy question is how to scale producer responsibility without scaling complexity. A harmonized national framework introduces a common foundation for expanded state-led EPR implementation that could reduce producer compliance costs, support infrastructure investment and associated economic activity, provide fiscal flexibility for local governments and strengthen the conditions needed for producer accountability. It may additionally fund system improvements, create incentives for better packaging design, and support the infrastructure needed to manage packaging more effectively. National alignment via a harmonized national EPR framework can give states a clearer foundation to build from, reduce complexity for producers, and support a more aligned packaging waste system.

Interpreting This Report

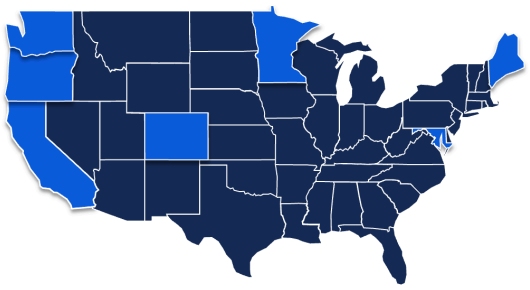
Findings represent economic projections, not a forecast. This work models a hypothetical national EPR framework and expanded EPR implementation under a set of assumptions, including a 30-percentage-point increase in recycling rates over 10 years based on international EPR precedents and available U.S. data. Outcomes vary by specific policy designs, implementation quality, market conditions, consumer behavior, infrastructure capacity, and state-level choices.

This report also acknowledges that EPR creates new costs for producers and that some portion of those costs may be passed through to consumers depending on market conditions, competition, and price sensitivity. The analysis is not intended to suggest EPR has no cost impacts; it is intended to examine the broader economic picture, including municipal budgets, investment, employment, producer compliance costs, and state-level activity.

This work was conducted by RTI International and funded by SC Johnson with technical advisory from WWF. The research questions addressed in this report were developed by SC Johnson and WWF to inform their understanding of EPR's economic implications. RTI served as an independent research partner responsible for the design, execution, and analysis of the study, applying objective and consistent methods throughout. The findings presented here reflect RTI's independent analysis and do not represent an endorsement of any specific EPR policy or legislative proposal by RTI.

The Economic Case for a U.S. National EPR Framework

Figure 1. States with EPR laws (2026)



Since 2021, the number of U.S. states enacting extended producer responsibility (EPR) laws for packaging has grown steadily, with additional legislation introduced in statehouses across the country each year. These early EPR laws have established models for EPR policy in the United States, that include eco-modulation, performance targets, source reduction, and producer-funded investments in collection, access, education, and end-market development. States have adopted differing definitions of covered materials, distinct reporting and data requirements, separate eco-modulation and fee structures, and unique timelines and compliance mechanisms with some states beginning to harmonize around definitions and program structure, as seen in Minnesota, Maryland, and Washington. As more states propose EPR legislation and begin to implement it, understanding the economic implications of this landscape and who benefits from EPR, including the trade-offs between consistency and fragmentation at the state level, is an important question for policy.

EPR's economic impacts extend across multiple sectors of the economy in distinct ways. EPR programs increase direct costs for producers, primarily through fees paid into EPR programs and reporting and compliance costs, though many shield small businesses to maintain competition. Producers may also incur additional costs for supply chain changes, packaging redesign, and material innovation (Laubinger et al., 2021).

EPR also holds implications for local governments, recycling systems, and the broader economy. (Organization for Economic Cooperation and Development [OECD], 2004) The evidence base supporting these impacts is limited and relies largely on prospective modeling rather than observed outcomes, particularly in the United States, where implementation is still nascent. For local governments and taxpayers, EPR is designed to shift a portion of waste management and recycling costs away from municipal budgets and onto producers, reducing the burden on local tax bases that have historically funded these services. (Walls, 2006) EPR-related reductions in local government expenditure may provide greater fiscal flexibility and may result in expanded public services, even if direct taxpayer savings are limited.

As investment in local and regional recycling systems increase, systems are likely to gain in capacity, performance, and increased access (Tumu et al., 2023). Investments in local recycling and reuse infrastructure have implications for the labor force employed in these systems as facilities increase in number and modernize. At the state and national levels, EPR's economic effects include employment associated with capital investment in recycling infrastructure and increased expenditure on materials innovation and secondary materials markets.

Economic theory and the available evidence agree that EPR-related producer costs are likely to be passed through to consumers, but the extent depends on market conditions and price elasticity (Brown et al., 2023). Existing estimates indicate relatively modest effects: one U.S. study estimated that household grocery spending would rise by 0.7% even if packaging prices doubled, while UK regulatory modeling estimated a 0.3% price increase for the lowest-income

households (Bose, 2022; UK Department for Environment, Food & Rural Affairs, 2024). Remaining costs may be absorbed through producer margins, suppliers, redesign, or operating efficiencies.

Across all affected groups, the scale and distribution of impacts depend heavily on program design, including fee differentiation, service-provider competition, and harmonization across jurisdictions.

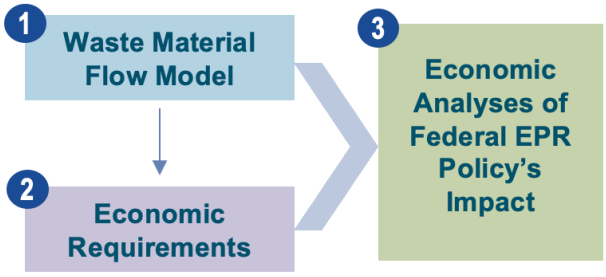
Core Analytical Questions and Approach

As an increasing number of states across the United States adopt EPR, this report aims to:

- **Expand the multidimensional economic evidence base focused on EPR**, moving beyond a narrow focus on producer and consumer price effects toward a more complete understanding of EPR's impacts on the U.S. economy; and,
- **Examine the notion that national harmonization of rules, including target methodology, timelines, definitions, and reporting requirements across U.S. states may drive economic benefit**, rather than focusing on a distinct policy design or proposal.

This report uses a forward-looking economic analysis of a hypothetical national EPR framework in the United States, designed to evaluate dimensions of the system-wide impacts of a harmonized federal policy. At the time of this analysis in 2026, the seven U.S. states with EPR policies reflect a patchwork of models, definitions, and targets, that are either in the early stages of implementation or have not yet been rolled out, creating a unique opportunity to assess the implications of a national framework. The analysis models a scenario that begins EPR implementation in 2026, in which producers assume financial and operational responsibility for managing packaging and printed paper waste, funding key elements of the recycling system, including collection, sorting, processing, education, and end-market development, under a coordinated national framework.

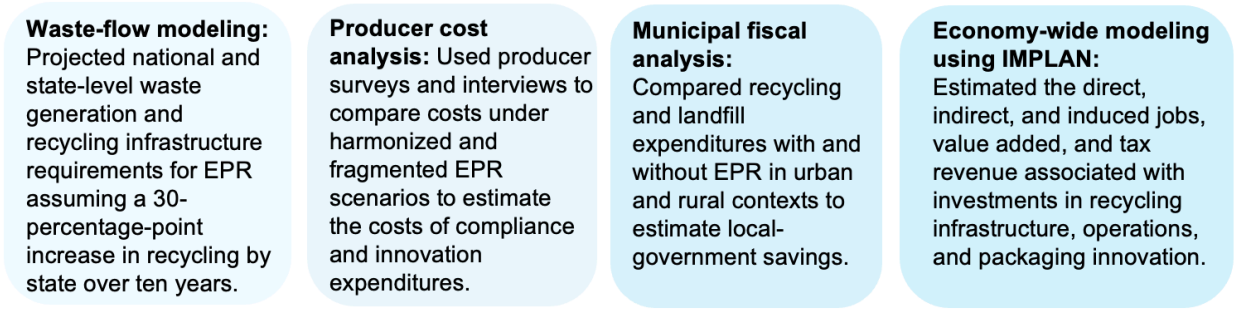
Figure 2. Interlinked Models and Analyses Used to Estimate the Impact of National EPR



To estimate the economic implications of EPR and a national framework to guide it, RTI developed interlinked models and analyses tied to changes in material flow (**Figures 2** and **3**). A waste flow model estimated changes in recycling volume under EPR, using data from the U.S. Environmental Protection Agency's (EPA, 2020) as a basis for state values.[1] Changes in material flows are translated into infrastructure requirements, capital and operating expenditures, and labor demand, forming the basis for economic modeling. This approach aligns with observed outcomes in existing EPR systems where possible and prioritizes simplicity in grounded assumptions in line with U.S. institutional and market realities.

[1] The waste stream continues to evolve since some underlying data were collected, including continued packaging lightweighting and reduced plastic intensity, trends that are not fully reflected in input data.

Figure 3. Economic Analyses Employed in This Report



Importantly, this analysis assesses EPR not as a single policy intervention, but as a systems change with implications that extend beyond recycling rates. By examining impacts across interconnected economic relationships, the report highlights how a national EPR policy could reshape elements of the U.S. economy. For producers, this includes changes in compliance costs, packaging design decisions, and investment in innovation. For suppliers and downstream partners, it includes new demand for materials, equipment, services, and technical expertise. For local governments, EPR represents a structural shift in cost responsibility, with the potential to relieve pressure on municipal budgets and enable greater fiscal flexibility. And for individuals, across both urban and rural communities, it may influence access to recycling services, local economic activity, and employment opportunities.

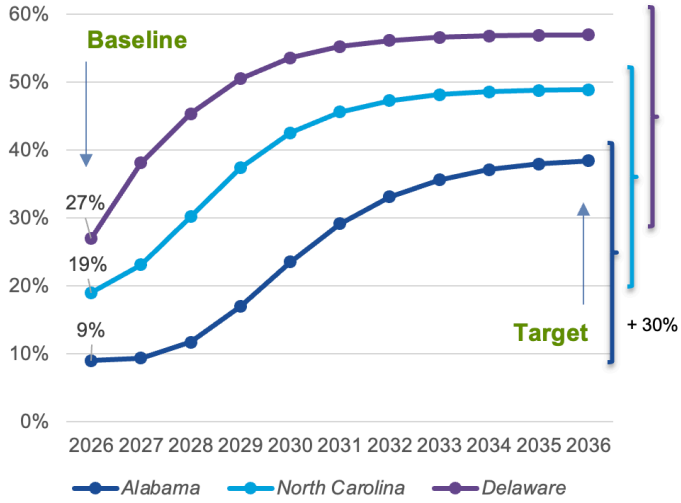
Critical Assumption: The Impact of EPR on U.S. Recycling Rates

In this analyses, **EPR policy is assumed to raise state recycling performance by 30 percentage points over a 10-year period**, with each state seeing a consistent increase from the 2026 estimated baseline recycling rate. Because EPR has not been implemented in the United States long enough to assess its outcomes, we adopt an assumption derived from a review of international EPR impacts on recycling rates, which range from approximately 15 to 50 percentage points, (The Recycling Partnership, 2023) and aligned with benchmarked global findings. (**Figure 4**) We adopt the assumption that implementation strategies influence the recycling rate (e.g., education vs. access) equally with different costs.

EPR Policy Modeling. Because EPR policies can vary widely in design, this analysis does not define a fully specified federal policy. Instead, we define the policy characteristics that matter most for the purposes of economic analysis. Appendix 1 details these assumptions specifically. In this scenario, a national EPR framework covers consumer packaging and paper, with limited exceptions, and applies to producers of covered products sold in the United States. Producers are responsible for funding the full net cost of managing covered materials, including collection, sorting, reuse, recycling, consumer education, enforcement, and end-market development. Producer fees are tied to the quantity of covered material placed on the market, while eco-modulation is assumed to create differentiated fees based on packaging attributes such as recyclability, PCR content, and reuse potential. Producers comply collectively through state-level PROs operating under nationally consistent rules, target-setting methodologies, and reporting requirements.

Core Data Sources. Waste-sector data are extremely limited, particularly waste generation estimates. This analysis uses the best available data. EPA's 2018 national waste generation estimates were used to estimate material inputs. As part of the agreed study approach, RTI relied on Bandhauer et al.'s (2021) *Paying It Forward: How Investment in Recycling Will Pay Dividends* to provide cost, jobs, and waste infrastructure inputs. All data sources and assumptions are included in the Appendix. Producer compliance cost estimates were collected through interviews and an online survey of companies in packaging EPR-related sectors, including personal care, food and beverage, and household products. Because many producers were complying with EPR reporting requirements for the first time, respondents provided best estimates of these costs, such as legal, reporting, and data-system expenses, and innovation spending to adapt or redesign packaging formats. Findings are based on a sample of nine large multinational corporations. These do not include EPR fees.

Figure 4. Illustrative Impact of EPR Policy on Recycling Rates of Targeted Materials



Benchmarking to International EPR Precedents

Findings from established EPR programs across the globe inform core assumptions and frame expectations for impact of EPR in the United States. EPR systems consistently show positive impacts on recycling rates, avoided waste management costs, job creation, and incentives for innovation, though outcomes measured vary. National-level economic evidence remains limited, and differences in market structure, policy design, recycling infrastructure, PRO competition, targets, and eco-modulation affect results. Overall, the literature supports core assumptions and helps to benchmark the findings in our report, including the assumed 30-percentage-point recycling-rate increase, which is positioned within observed international increases.

The review prioritized well-documented EPR systems with available monitoring data, including the European Union and British Columbia, and studies assessing regional or macroeconomic impacts. Findings should be interpreted cautiously because international jurisdictions differ from the United States in market structure, policy design, and recycling infrastructure.

Change in Recycling Rates. The most widely measured EPR outcome is the change in recycling rates. Germany's recycling rate increased by 39 percentage points from 1991 to 2016 under EPR (Edwards & Stoner, 2022; Mallick et al., 2024). From 2008 to 2018, France's rate increased by approximately 10 percentage points and Italy's by 8 percentage points (Eunomia, 2021). In Portugal, recycling-rate gains between 1998 and 2015 ranged from 14 percentage points for glass to 63 percentage points for metal, including a 39-point increase for plastic. Spain recorded increases ranging from 25 percentage points for paper and cardboard to 58 percentage points for metal, including a 35-point increase for plastic (Rubio et al., 2019).

Cost Efficiency. Cost efficiency is measured in several ways and is impacted by recycling system design, including collection and landfill costs and the relationship between recycling outcomes and investment. In British Columbia, Canada Bartlett et al. (2016) estimated both avoided mixed-waste collection costs, calculated from household collection costs and waste generation, and avoided landfill costs from diverting materials through EPR. Total avoided costs reached CAD 32.2 million in 2014. Facco and Berner (2025) measured cost efficiency resulting from implemented EPR in European markets. Plastic cost-efficiency ratios ranged from 0.03 in France to 0.13 in Germany; with higher efficiency attributed to competition among PROs. Other evidence suggests that while competing PROs may reduce producer fees, non-competitive. PRO models may achieve higher recycling rates overall (Mallick et al., 2024). For glass, cost-efficiency ratios were most impacted by the cost to maintain more collection sites.

Jobs Created. Systemiq (2024) modeled employment across the plastics value chain under a scenario combining 15 policy interventions, including EPR, across nine world regions. The scenario was projected to support 11.9 million direct jobs by 2040, a 70% increase from 7 million in 2019, although the effect cannot be attributed to EPR alone. More directly, Bartlett et al. (2016) estimated that British Columbia's EPR programs generated a net 900 jobs in the province and nearly 2,300 globally in 2014, after accounting for gains in recycling and waste management and losses in collection and landfilling. Kim (2012) also estimated that expansion of South Korea's EPR system created 4,260 jobs between 2003 and 2007.

Innovation. EPR policy design holds important implications for innovation outcomes. Existing state-level EPR design in the United States include components associated with higher innovation spending than other global EPR examples driven by an emphasis on eco-modulation. Facco and Berner (2025) classified EPR systems in eight European countries by their capacity to support ongoing innovation in recycling and packaging. High-performing systems, including Germany and Italy, combine drivers such as PRO competition, harmonized standards, and eco-design incentives. Moderate performers, such as Belgium, France, and Spain, rely more heavily on centralized regulation and tend to achieve steadier, incremental innovation. Lower-performing or developing systems, including Austria, the Netherlands, and the Czech Republic, face constraints such as market fragmentation, limited competition, and an emphasis on cost control.

Eunomia (2021) examined whether eco-modulation encourages design-for-recycling. The study suggests that France's steadier recycling-rate growth may partly reflect its use of eco-modulated fees, while Germany applies eco-modulation more narrowly within a multiple-PRO system. However, Italy achieved greater recycling gains than France without eco-modulation, indicating that EPR performance depends on multiple policy features. Recycling targets may be especially important: Germany has the most stringent targets, while France and Italy align more closely with the EU packaging-waste target of 70% by 2030 (Eunomia, 2021).

Local Government Cost Impacts

Municipal and local tax bases incur EPR savings from increased producer-funded recycling system spending and averted waste expenditures within already tight budgets.

- EPR generates substantial municipal savings which enhance municipal fiscal flexibility by shifting recycling costs to producers and reducing landfill disposal needs, cutting waste management costs by roughly 49%–53% in both urban and rural settings and amid rapid population growth and stagnation.
- Savings emerge primarily from direct cost transfer (producer-funded recycling) and increased recycling rates that reduce landfill volumes and associated costs over time.

Local governments and taxpayers currently fund recycling and landfill disposal, even though producers generate much of the packaging waste entering the system. Low or stagnant recycling rates further increase reliance on landfilling and limit potential savings. EPR can address this imbalance by shifting recycling costs to producers and increasing diversion, reducing municipal expenditures and expanding fiscal flexibility. These savings may not directly reduce taxes but could help delay tax increases or support other public services.

To assess EPR's potential effects on local budgets, we examine two illustrative case studies: urban Thornton, Colorado, and rural Miami County, Indiana, representing different recycling infrastructure and population-growth contexts. Rather than examining state-specific policies, these case studies examine the effects of a hypothetical EPR framework. The analysis draws on public waste management data from each location and applies a 30-percentage-point increase over 10 years to account for EPR's impact, alongside population projections.



Urban: Thornton, Colorado*

Thornton, CO, is an urban municipality within Adams County in the Denver metropolitan area with 149,000 residents. Thornton offers trash and recycling pickup services to all residents and has had a participation rate of 60%–65% during the last decade. As of 2024, Thornton's baseline recycling rate was 12%, and the city experienced steady population growth of 2.4% year-over-year throughout the last decade. Assuming these trends continue, Thornton will go from producing 49,586 tons of municipal solid waste (MSW) in 2026 to 62,477 in 2036.

**Covered under Colorado's EPR law.*

Savings to Thornton's Tax Base

A 30-percentage-point increase in recycling rate from EPR could move Thornton from producing 43,087 tons of landfill waste in 2026 to 36,244 tons in 2036 and from producing 5,628 tons of recyclable waste in 2026 to 26,232 tons in 2036. In 2026, Thornton is projected to spend $3.0 million on landfill waste disposal and $1.2 million on recycling. By 2036, these costs are projected to increase to $3.8 million and $1.5 million, respectively. ***With EPR, Thornton will spend $2.5 million on landfill waste disposal and $0 on recycling (costs averted due to the EPR policy), amounting to a net annual savings of $2.8 million, or 53% of Thornton's annual waste disposal costs.***



Rural: Miami County, Indiana

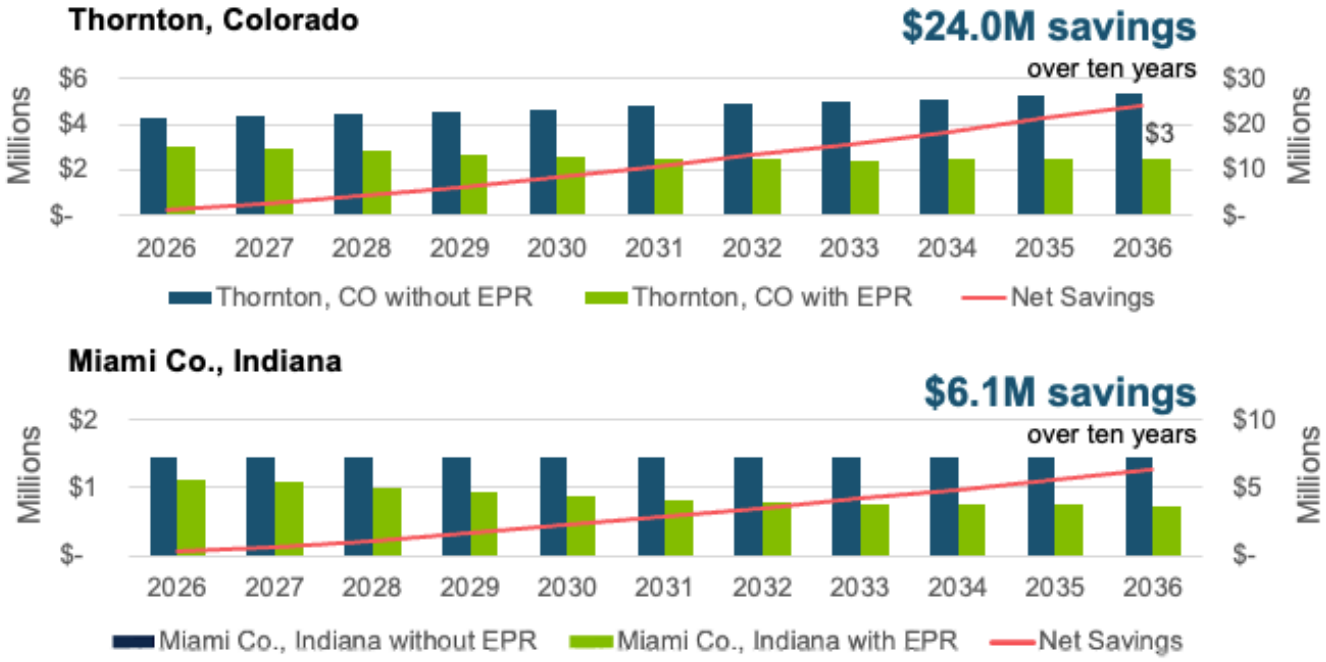
Miami County, IN, is a rural county in Indiana with 40,000 residents. The County has a recycling program that operates five drop-off locations around the county. The county's population has been stagnant throughout the last decade, with a consistent 13,000 to 14,000 households. Including commercial MSW, Miami County's recycling rate in 2024 was 14%. Miami County is expected to produce roughly the same volume of MSW in 2036 as 2026, 18,623 tons, due to its stagnant population growth.

Savings to Miami County's Tax Base

Miami County could shift from producing 15,762 tons of landfill waste in 2026 to 10,384 tons in 2036 and will go from producing 2,861 tons of recyclable waste in 2026 to 8,239 tons in 2036. In 2026, Miami County is projected to spend $1.1 million on landfill waste disposal and $300,000 on recycling. Assuming no population growth and using constant 2026 dollars, Miami County will be spending the same amount for MSW management in 2036. ***Under EPR, Miami County may spend $710,000 on landfill waste disposal and $0 on recycling, amounting to a net annual savings of $700,000, or 49% of Miami County's annual waste disposal costs.***

The results shown in **Figure 5** demonstrate the compounding positive effects of EPR policy on municipal budgets. Besides shifting recycling costs from municipalities to producers, EPR can generate savings by gradually increasing recycling rates and diverting a larger share of MSW from landfill disposal to recycling streams, reducing the costs of landfilling to local governments. While for Thornton and Miami County, recycling and landfilling costs were distinct and could be modelled as independent waste streams, other municipalities procure MSW management services through bundled contracts that combine collection, recycling, hauling, and disposal. In these cases, reductions in recycling costs or avoided landfill fees may not translate into proportional reductions in contract costs.

Figure 5. MSW Expenditure With and Without EPR



In Thornton, transferring recycling costs to producers (i.e., not accounting for reduced landfilling) would save an estimated $1.5 million, or 28% of the city's MSW disposal costs. In contrast, reduction in landfill waste from EPR recycling infrastructure and education would save $1.3 million, or 24% of MSW disposal costs. In Miami County, the transfer of recycling costs alone would save approximately $300,000, or 21% of Miami County's MSW disposal costs, whereas reduction in landfill waste from EPR recycling infrastructure and education would save $400,000, or 28% of MSW disposal costs.

Job Impacts of EPR-Related Investments in Infrastructure, Operations, and Innovation

EPR expansion nationally would drive investment in recycling infrastructure and education as well as producer-led innovation, generating substantial economic benefits through job creation, income growth, and tax revenue.

- Infrastructure investment under expanded EPR and national EPR framework is projected to support 275,500 job-years over 5 years, including direct jobs in construction, equipment manufacturing, and recycling education; indirect supply chain jobs; and induced jobs supported by workers' household spending. A single job-year represents one year of employment supported by EPR; this is meaningful where temporary or contract jobs are supported, when two 6-month contracts would equal a single job-year.
- Once operational, new recycling facilities and systems are projected to support 36,200 direct collection, sorting, and processing jobs, plus approximately two indirect or induced jobs for every direct job.
- New construction of recycling infrastructure and system operations drive $6–$9 billion, respectively, in labor income per year.
- EPR investments generate significant fiscal returns, totaling $9.5 billion in state and local tax revenue over 10 years, with up to $934 million occurring annually in the years of greatest infrastructure investment.
- Producer investments in packaging innovation to meet EPR requirements are estimated to support 79,900 job-years annually.

Jobs Associated with EPR-Related Recycling Infrastructure Investment. A national EPR framework implemented across all 50 states would spur a mix of capital and programmatic investments, including recycling infrastructure upgrades, equipment purchases, new recycling capabilities, and household recycling education. This analysis estimates EPR's impact on job creation, economic value added, and state and local tax revenue using core assumptions about EPR's impact and infrastructure requirements to meet the increase in recycled material.

We estimate these impacts (**Table 1, Figure 6**) over a ten-year hypothetical timeline, where the first five years reflect construction, equipment manufacturing, recycling system upgrades, and education programs. Years 1 and 2 include heavy capital investment, which shifts toward plastic film recycling capabilities in years 3 and 4, with year 5 focused on household education alone. Years 6–10 are focused on operational implementation, including the required processing, sorting, and management of the recycling system. For this analysis, we discuss jobs using *job-years*, a standardized metric that represents one year of employment supported by an economic activity. For example, one job lasting 2 years represents 2 job-years, while two jobs lasting 6 months each represent one job-year. Job-years may include full-time, part-time, or seasonal employment and do not represent unique workers employed.

Direct impacts. Direct jobs are those supported by the activities funded through EPR-driven investment, estimated to support 40,800 direct jobs per year during the heaviest years of investment. In Years 3 and 4, as spending shifts toward enhanced recycling capabilities and continued household education, direct employment declines to 23,700 jobs per year. By Year 5, direct employment is estimated at 12,200 jobs. Across the 5-year construction and investment

period, direct impacts total 141,200 job-years. In Years 6–10, approximately 36,200 steady-state operational jobs will be required to collect, sort, and process materials using the new recycling infrastructure; these would continue as long as EPR is implemented.

Indirect impacts. Indirect jobs are supported by supply chain spending on suppliers, contractors, equipment manufacturers, and professional services. Estimated employment declines from 17,900 jobs annually in Years 1–2 to 7,600 in Years 3–4 and 4,000 in Year 5, totaling 55,000 jobs over 5 years. In Years 6–10, 32,900 indirect jobs will result from operational employment.

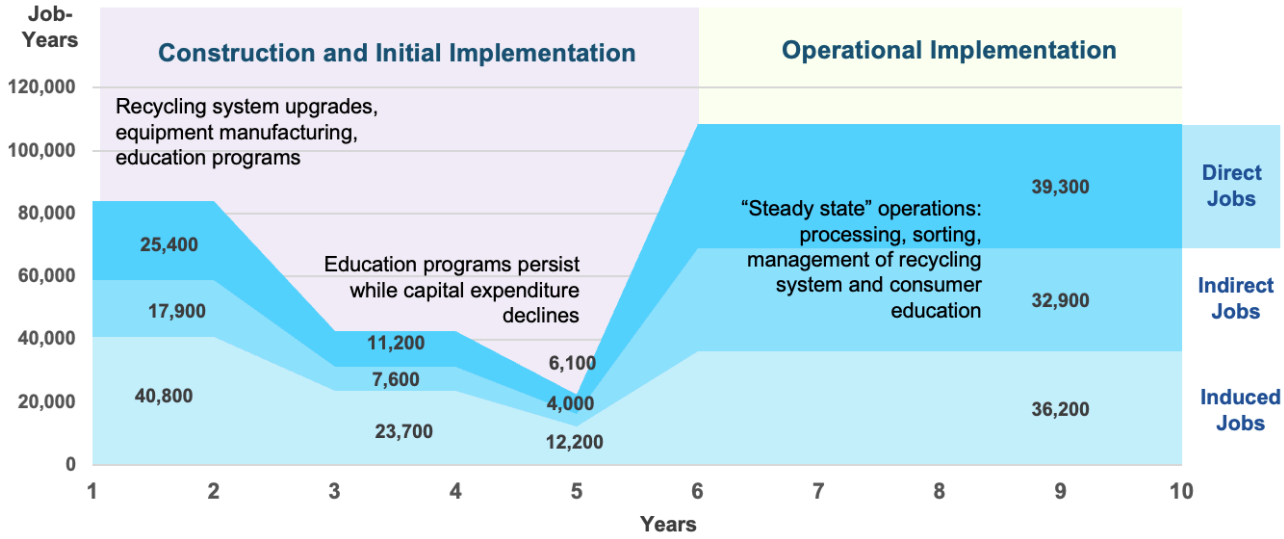
Induced impacts. Induced jobs are supported by workers' spending in the broader economy, including retail, housing, food services, and other local sectors. Estimated induced employment declines from 25,400 jobs annually in Years 1–2 to 11,200 in Years 3–4 and 6,100 in Year 5. In Years 6–10, 39,300 induced jobs will result from operational employment.

- **Direct jobs:** Employment generated by the initial EPR-related investments, including activities such as construction, equipment manufacturing, and recycling education.
- **Indirect jobs:** Employment supported through supply chain activity—businesses that provide goods and services to recycling operations and to their upstream suppliers.
- **Induced jobs:** Employment resulting from household spending by workers whose wages are supported (directly or indirectly) by EPR-related investments.
- **Labor income:** Total compensation paid to employees and business owners, including wages, benefits, and proprietor income.
- **Total value added:** The incremental value created by labor, capital, management, and taxes (a measure of gross domestic product [GDP] contribution).
- **State and local tax revenue:** The value of taxes generated for state and local governments because of economic activity associated with EPR investments.

Table 1. Impacts that Result from Recycling Investment and Operations by Year (in 2026 millions of dollars)

	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*	*Year 7*	*Year 8*	*Year 9*	*Year 10*
	Construction and Investment					**Operations**				
Jobs										
Direct	40,800	40,800	23,700	23,700	12,200	36,200	36,200	36,200	36,200	36,200
Indirect	17,900	17,900	7,600	7,600	4,000	32,900	32,900	32,900	32,900	32,900
Induced	25,400	25,400	11,200	11,200	6,100	39,300	39,300	39,300	39,300	39,300
Total Jobs	84,100	84,100	42,500	42,500	22,300	108,400	108,400	108,400	108,400	108,400
Labor Income	$6,010	$6,010	$2,651	$2,651	$1,449	$9,312	$9,312	$9,312	$9,312	$9,312
Value Added	$9,995	$9,995	$4,215	$4,215	$2,313	$16,211	$16,211	$16,211	$16,211	$16,211
State/ Local Tax Revenue	$934	$934	$379	$379	$186	$1,348	$1,348	$1,348	$1,348	$1,348

Figure 6. Job Impacts from Recycling Investment and Operations by Year (in 2026 millions of dollars)



In addition to employment, these investments are expected to generate substantial economic activity. During the first 5 years, the modeled investment would generate approximately $18.8 billion in labor income, $30.7 billion in value added, and $2.8 billion in state and local tax revenue. Impacts are highest in the first 2 years, when capital investments are largest, and decline as infrastructure investments complete and spending shifts to education and other activities.

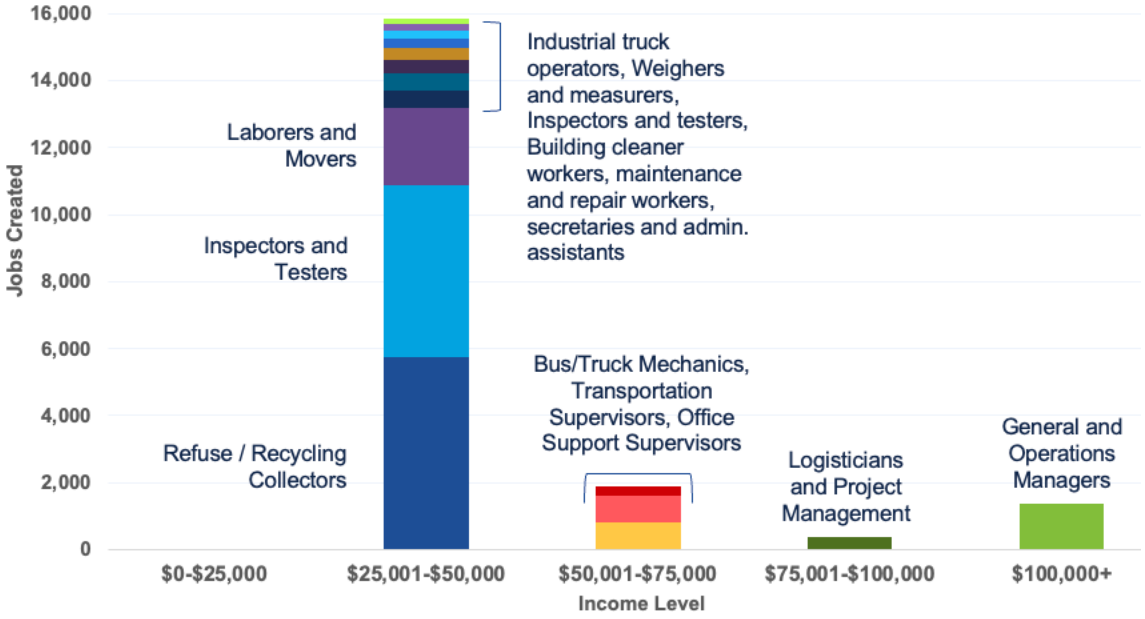
Each job in the waste management sector will support two additional indirect or induced positions in the broader economy. Each year, these workers and proprietors will earn $9.3 billion in labor income. State and local government may receive up to $1.3 billion dollars in tax revenue each year.

Implications for Labor Markets. Expanding EPR policy in the United States will translate into workforce demand across collection, processing, and implementation support functions to implement. We explore this shift by estimating the scale, composition, and types of jobs needed to execute the policy.

If EPR were expanded across the United States, **more than 36,000 direct jobs would be supported in the operations and implementation of the policy alone** (as opposed to construction of capital), primarily concentrated in the waste management and recycling sectors. Expanded recycling access and higher material volumes may increase demand for collection, processing, and supporting management, administrative, maintenance, and fleet-repair roles.

Figure 7 shows that most jobs supported by national EPR implementation are concentrated in occupations earning between $25,001 and $50,000 annually, particularly refuse and recycling collectors, inspectors and testers, and laborers and material movers. Smaller numbers of jobs fall in higher income categories, including mechanics, transportation and office support, logisticians, and managers. The distribution reflects the labor-intensive nature of collection and processing, while showing demand for technical and management roles needed to operate expanded and automated recycling systems. Increasing automation may shift these requirements as more enhanced recycling facilities become widespread.

Figure 7. Estimated Job Creation for National EPR Implementation by Occupation Type and Income Level



Job creation is expected to be concentrated in frontline collection and transportation roles, with refuse and recyclable material collectors and truck drivers accounting for 40% of projected employment and, together with laborers and material movers, nearly half of all new jobs. Many of these positions have accessible entry requirements, typically requiring high school diplomas and no formal credential with on-the-job training. EPR implementation would support smaller numbers of higher-wage technical, supervisory, and management roles, including mechanics, logisticians, and project and operations managers. Expanded system operations would further increase demand for maintenance workers, dispatchers, and transportation supervisors, while creating opportunities in some occupations that are otherwise projected to remain flat or decline nationally.

Jobs Associated with EPR-related Innovation Investment. Eco-modulated fees incentivize producers to reduce packaging volume and improve recyclability. As a result, some producers adapt their packaging material mix to reduce overall volume and increase recyclability.

To estimate the related innovation costs and employment impacts, RTI surveyed producers about their realized and anticipated investments. The highest quality and confidence estimates were received from producers in the food and beverage sector, which stands to be highly impacted by packaging EPR; as a result, we focus our analysis on this sector. Nine large multinational corporations responded to the survey with estimated annual revenues exceeding $50 million; as a result, innovation estimates are representative of larger companies.

Survey respondents estimated annual packaging innovation costs between $1 million to $5 million, sustained for 3–5 years after EPR implementation. We extrapolate these estimates across the food and beverage manufacturing sector, excluding smaller firms exempt from EPR fees, resulting in more than $8 billion in annual packaging innovation investment. Although respondents indicated that packaging innovation may take place over 3–5 years in response to EPR incentives, these estimates represent a conservative assumption of a one-time investment in one year of packaging innovation. Measures of job impacts represent the number of job years from a one-time innovation investment. Total job figures across direct, indirect, and induced impacts are presented in **Table 2**.

Direct impacts. Direct jobs are those supported by the activities funded through EPR-driven innovation investment, including materials science, engineering, design, and related corporate support positions. A one-time, EPR-driven innovation investment by companies in the food and beverage sector is estimated to support 23,800 direct jobs.

Indirect impacts. Indirect jobs result from business-to-business spending throughout the supply chain, such as purchases from suppliers, contractors, equipment manufacturers, and professional service providers. A one-time, EPR-driven innovation investment by companies in the food and beverage sector is estimated to support 23,800 indirect jobs.

Induced impacts. Induced jobs result from workers spending wages and income in the broader economy, supporting employment in sectors such as retail, housing, food services, and local services. A one-time, EPR-driven innovation investment by companies in the food and beverage sector is estimated to support 32,300 induced jobs.

Table 2. Impacts that Result from One Year of EPR-Driven Food and Beverage Packaging Innovation (in 2026 millions of dollars)

Impact	Employment (job-years)	Labor Income	Value Added	State and Local Tax Revenue
Direct	23,800	$3,116	$4,322	$210
Indirect	23,800	$2,095	$3,390	$207
Induced	32,300	$2,325	$4,366	$415
Total	**79,900**	**$7,536**	**$12,078**	**$832**

Total employment impacts from EPR-driven innovation investment amount to 79,900 job years, supporting a range of high-skill technical and professional employment, supply-chain jobs, and broader service-sector employment. Direct jobs are comprised of materials scientists, packaging and process engineers, industrial and product designers, sustainability specialists, and related corporate support staff working to reduce packaging volume or improve recyclability; indirect jobs are comprised of suppliers, contractors, equipment manufacturers, laboratories, design firms, and professional service providers; and induced jobs are comprised of service sectors such as retail, housing, food services, and other local services. Detailed occupational estimates are provided in Appendix A.

Producer Efficiencies from a Harmonized EPR Framework

Harmonization of EPR policies across the United States is likely to reduce producer reporting costs associated with adhering to multiple EPR policies.

- Fragmented state-by-state EPR systems increase producer compliance costs relative to a harmonized national approach, with the cost of compliance per state varying from $86,000 to $167,000 when a state implements an EPR policy with unique requirements.
- The biggest added costs come from navigating different state requirements, especially legal and regulatory interpretation, source and supply data collection and reporting, and repeated PRO registration and reporting. Data are self-reported from producers and reflect different products, markets, assumptions, and policy preferences.

EPR policies are designed to shift the financial burden of recycling systems from municipalities and taxpayers to packaging producers, while supporting investment in recycling access and infrastructure. In doing so, producers assume the direct costs of managing the waste associated with their packaging, as well as compliance costs, including understanding regulations, registering with PROs, collecting and reporting data aligned to each law's definitions, and investing in packaging redesign to reduce producer fees. Harmonized definitions, which a national EPR framework would help to guide, could reduce producer inefficiencies from varied state-by-state polices.

This analysis examines the added costs producers face under hypothetical fragmented state-by-state EPR systems compared with a hypothetical harmonized national framework. Three scenarios are compared: (1) a harmonized national EPR framework with one consistent set of national minimum requirements, (2) a fragmented system in which 10 unique EPR frameworks emerge as dominant models for EPR across the United States, and (3) a system where all 50 states have unique EPR frameworks. To model the fragmented scenarios, we model the costs producers incur to interpret different rules, determine compliance pathways, and collect and format data for different reporting systems. In the harmonized system, these costs are aligned to a single set of compliance and reporting requirements. The analysis focused on incremental administrative costs during periods of active implementation and planning. As EPR programs mature and expand, approaches and systems to manage compliance may become more routinized and efficient, minimizing these costs over time.

Self-reported data collected by RTI in a brief survey of nationwide producers in the food and beverage, retail, household goods, and personal care sectors was used in this analysis. The sample included nine, purposively selected, large multinational corporations. Reported costs reflect the compliance investment capacity of larger corporations and do not represent the costs across all sectors or company sizes, nor do they reflect EPR fees themselves.

We present the total costs of compliance for producers in Table 3. We find that in the 50 framework scenario, producers would face a total of $8.3 million in administrative costs per year. In the 10 framework scenario, these costs would reduce to $5.1 million per year. Under a harmonized system with one nationwide policy, these costs would reduce $4.3 million per year, a reduction of 48% from the 50 framework scenario and a 16% reduction from the 10 framework scenario. The total marginal cost to comply with a new reporting framework nearly doubles producer costs, from $86,000 to $167,000.

Table 3. Administrative Cost Estimates for a Single Producer in the Food & Beverage Sector to Comply with EPR Framework Fragmentation for a single year, by Scenario

	Harmonized Scenario	10-Framework Scenario	50-Framework Scenario
Administrative Costs	$4,294,000	$5,091,000	$8,325,000

Each additional framework adds marginal cost, while the marginal increase per new unique state is likely to decline as producers gain compliance efficiency. The components of compliance costs also vary by activity when a marginally new EPR reporting framework is introduced. For compliance with a single new EPR policy, companies reported projected legal and regulatory costs increasing from roughly $6,500 to $13,000 in states that possess unique EPR requirements. Additional costs to understand regulations and determine packaging compliance increase for new frameworks, from a projected cost of $7,000 to $36,000. Other costs noted by producers include costs of packaging compliance, data collection, reporting, registration, software and systems changes, and trainings.

Reuse Creates Economic Value Through Services

Reuse represents a viable pathway for EPR policies to support job creation and local economic activity. Reuse is often framed as a waste-reduction strategy, but in practice its success depends on a service system (**Figure 8**): collection, return, washing, transport, redistribution, training, and program administration that can create economic value. Comparing three settings shows that reuse is economically promising and operationally feasible and that context can differentiate its value proposition.

Figure 8. Reuse Services Driving Economic Value



In controlled, high-volume settings (e.g., sports and entertainment venues) that value appears fastest through cost savings and new revenue. These examples suggest a likely adoption pathway: high-volume anchor institutions and controlled settings are the strongest first movers, while broader community systems may scale once infrastructure, business models, and consumer expectations are better established.

In **closed loop venues, reuse provides direct returns and provides a clear integration to a viable business model.** Bold Reuse (Bold Reuse, 2026) found that 71% of surveyed sports and entertainment venues using reusable models reported measurable cost reductions, with some programs generating up to $500,000 in sponsorship value. Further, many programs fully integrated reuse operations within 3 months. Economic value comes primarily from lower waste-hauling costs and reduced purchasing of single-use items, with returns improving over time as reuse systems mature. In closed loop venues, use is primarily within the venue, making return rates high: all active programs surveyed had rates above 70% return, a critical factor for financial viability. The services driving that value are collection, washing, logistics, signage, and operational refinement. Because venues serve large volumes of people, they can anchor local reuse infrastructure to facilitate follow-on adoption by local businesses.

Open-loop community systems involve increased stakeholders and exit points for reusable goods, providing a challenge for returns that are essential for economic viability. The Petaluma Reusable Cup Project demonstrated reuse's feasibility in a community setting involving 30 restaurants over 3 months. (Closed Loop Partners, 2025) Customers returned cups via more than 60 bins with no deposits, penalties, or registration, and more than 220,000 cups were returned. The project exceeded its break-even costs, proving viability using shared local infrastructure rather than as an individual business-led initiative. The core economic value came from building and coordinating the services needed to make a citywide system work: return infrastructure, operational partners, transport, washing, and coordination across businesses. Reduced cost compared to disposable alternatives offered a route to financial and environmental viability, while emphasizing that cost, washability, transport efficiency, and durability of the reusable asset (i.e., the cup) is essential.

Semi-closed-loop systems, like public schools, depend heavily on support services and established reuse infrastructure to deliver, limiting immediate economic returns. Ten elementary schools in a California district shifted to reusable service ware, supported by a $50,000 grant and washing expenses of $150,000 per year. (Fiedler et al., 2025) Viable continuation would require in-house dishwashing or a central kitchen with a dishwasher, financial realities that may challenge budget constrained public institutions.

Economic Activity from Expanded Rural Recycling Access

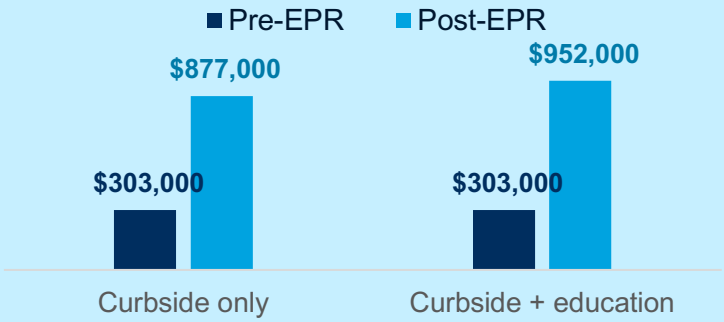
Where EPR policies support increased rural recycling services, rural communities stand to gain not only from increased access, but also from the spending and operational activity required to extend recycling services into rural and underserved areas. Increased rural recycling can generate meaningful economic activity through transport contracts, local hauling and servicing, transfer-site operations, equipment purchases and maintenance, and local staffing for education or site management. Expanded EPR would support channeling capital investment and service spending into communities that are newly integrated into the recycling system. Although the impact of any single contract may be modest locally, the aggregate value could be substantial across the many U.S. communities that benefit.

This case study examines how a national EPR framework could generate economic benefits in rural communities by funding contracts for expanded recycling services such as hauling, servicing, curbside collection, and recycling education, which can be included in EPR programs. Miami County, Indiana, provides strong illustrative example because it currently relies entirely on drop-off recycling sites, a common model in rural areas.

To reflect a hypothetical national EPR framework, we modeled a shift toward curbside recycling and expanded community education. Using statewide waste flow data, EPA and National Academies estimates, and cost and performance assumptions from Bandhauer et al., 2021, we model the level of investment needed to increase Miami County's recycling rate by 30 percentage points. The county currently recycles 380 tons of MSW annually out of 7,750 tons total; a 30-percentage-point increase would result in 2,350 tons per year.

Curbside Expansion Only. To achieve the target through curbside recycling alone, Miami County would need to expand curbside service to about **80% of households**. This would require an estimated **$1.1 million in initial infrastructure investment** for material recovery facilities (MRFs), trucks, and transfer sites, while increasing annual hauling and servicing expenditures **from $303,000 to $877,000**.

Figure 9. Projected Change in Local Contracting Expenditure



Curbside Expansion plus Education. Pairing curbside expansion with recycling education reduces the required curbside coverage. Using data from The Recycling Partnership, a $10-per-household education investment can increase household recycling rates by 40%. With education, Miami County

would need curbside service for about 56% of households, requiring an estimated $790,000 in one-time infrastructure investment and $952,000 in annual servicing costs.

When infrastructure investments are annualized, both scenarios generate notable increases in annual recycling services locally: between $675,000 (curbside only) and $721,000 (curbside-plus-education). Approximately 20% of Americans live in rural areas, where expanded recycling, both curbside and drop-off, will not only bring new environmental benefits, but also bring economic promise in locally contracted recycling services.

Examining EPR's Impacts on rPET Markets

End-markets are essential to EPR's goals of activating a circular market for materials. Polyethylene terephthalate (PET) is a useful example because it has an established recycling pathway and active demand from bottle, packaging, fiber, strapping, and other manufacturers. Yet the U.S. rPET (recycled PET) market remains vulnerable to changes in collection volumes, feedstock quality, virgin-resin prices, imports, reclaimer viability, and recycled-content demand (Smith et al., 2022; Voloschuk, 2026). This instability reflects a coordination problem across the value chain. Manufacturers need reliable volumes of rPET at competitive prices that meet color, contamination, performance, and, in some applications, food-contact specifications, but the collection and processing system does not reliably provide this consistency (Basuhi et al., 2024). The lack of consistent rPET supply at competitive prices challenges producers' ability to secure contracts or long-term commitments. (Voloschuk, 2026) EPR could help close this gap by financing collection, sorting, processing, system coordination, and end-market development. Its economic value would depend not only on collecting more PET, but on converting it into specification-grade material that domestic manufacturers can use.

Baseline U.S. rPET Market. The United States has a functioning but supply-constrained PET recycling system: The U.S. PET bottle recycling rate was 30.2% in 2024, down from 32.5% in 2023 but slightly above the previous decade's average of 29.5%. (National Association for PET Container Resources [NAPCOR], 2025) This relative stagnation contrasts with growing demand for recycled content. (Basuhi et al., 2024) Demand for rPET, particularly for packaging, is steady and could increase as EPR policies expand. Bottle applications accounted for more than 60% of rPET sold into U.S. and Canadian end-markets in 2024, while average recycled content in U.S. PET bottles reached 15.9%. In 2022, U.S. bottles consumed approximately 870 million pounds of rPET, following a 15% annual increase in recycled-content use. However, substantially higher collection would be needed to support more ambitious recycled-content levels. Domestic supply has declined slightly in recent years, while imports reached a record 23% of U.S. and Canadian rPET supply. While imports help fill supply gaps, greater dependence on them may expose domestic users to trade, transportation, traceability, and price risks and hinder incentives for domestic rPET market development.

How Might EPR Impact rPET Supply? This analysis considers a hypothetical scenario in which EPR-supported investments increase PET bottle recycling by 30 percentage points, from 30.2% in 2024 to approximately 60.2%. Holding bottle generation constant, this would nearly double collection. If reclaimers can maintain financial viability and maintain the 2024 recovery yield of 85.2%, most additional material could become usable output, although actual yield would depend on contamination, packaging design, color mix, and plant capabilities. EPR-funded improvements in sorting, washing, reclamation, and packaging design could further increase usable rPET by reducing processing losses. EPR would additionally fund necessary improvements across the recycling system including expanded collection access and consumer

education, upgraded processing capacity, packaging-design incentives, traceability, quality verification, and end-market development.

Economic Implications of Improved rPET Supply and Reduced Price Volatility. EPR-supported improvements in collection and processing could keep more PET within domestic recycling and manufacturing and increase the volume and consistency of specification-grade feedstock. A stronger domestic supply could displace some imports where U.S. rPET is competitive and may moderate supply-driven price volatility, although exposure to virgin-resin prices, energy costs, trade, and changing demand would remain. These benefits may encourage producers seeking to meet EPR-related plastic source reduction targets to transition packaging formats to rPET. These outcomes also depend on responsible end-market development, which EPR investments are obligated to support: increasing collection without sufficient processing capacity negates these benefits.

In this role, expanded EPR could finance upstream system functions that private purchasers rely on but cannot efficiently provide on their own. The resulting economic value would come from converting more discarded PET into dependable manufacturing inputs while reducing uncertainty across the domestic rPET value chain.

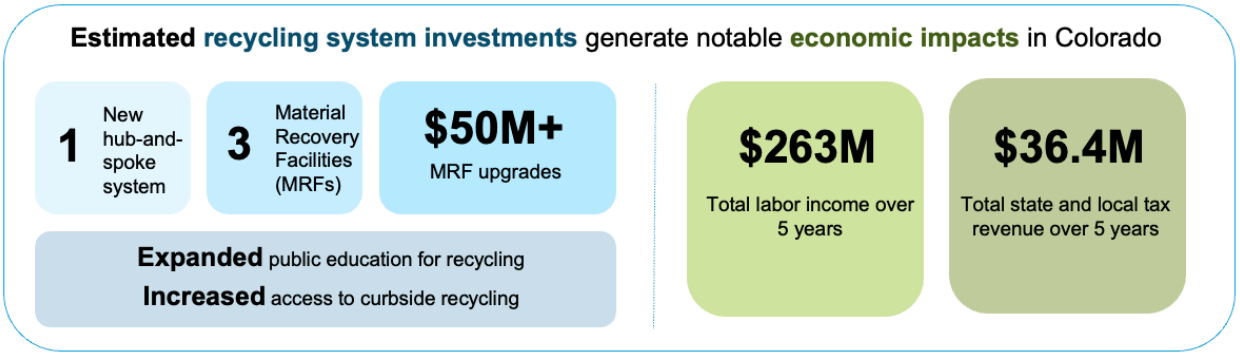
State-Level Case Studies

These state case studies demonstrate the importance of understanding EPR impacts at the state level, where differences in infrastructure, access, and baseline recycling performance[2] drive variation in both investment needs and economic outcomes. Although the policy framework is national in scope, its effects will be felt locally. EPR is expected to produce widespread economic impacts across the United States, stimulating job creation, increasing economic output, and generating new tax revenues in multiple sectors beyond waste management. All analyses reflect the core assumption that expanded EPR will introduce a 30-percentage-point increase in recycling rate of EPR-covered materials used consistently throughout this analysis.

These state case studies do not compare national and state EPR systems. Rather, they illustrate the scale of economic activity associated with achieving modeled EPR outcomes under the assumptions used throughout this analysis. States already implementing EPR programs may realize many of these benefits through their own programs.

Colorado

- Achieving a 44% recycling rate in Colorado requires substantial system expansion that would generate approximately 770 short-term jobs and $132M in economic activity in early years, then stabilize at approximately 640 ongoing jobs and $205M annual economic contribution, and $13M in annual tax revenue.



Colorado is already implementing packaging EPR. The purpose of this case study is not to assess Colorado's existing program, or suggest replacement by a federal policy. Instead, it illustrates the scale of economic activity associated with achieving modeled EPR outcomes under a representative national implementation scenario, and should not be considered as a parallel to existing program projections. Importantly, Colorado's state EPR law is operational as of 2026 with system implementation only beginning at the time of this analysis, meaning that no impacts from the policy have been captured in this analysis.

Colorado's recycling system includes MRFs, transfer stations, and composting sites, but these resources are not spread evenly across the state. Most recycling capacity is concentrated along

[2] State-level recycling rates in this section are residential recycling rates that also include material captured through state deposit return systems. Data on recycling rates comes from The Recycling Partnership's *State of Recycling* report (Appel et al., 2024).

the Front Range, where more than 80% of Coloradans live. In other parts of the state, especially mountain and rural communities, long distances and difficult terrain can make recycling much harder to provide (Circular Action Alliance et al., 2025). About 31% of households in municipalities do not currently have access to curbside recycling and the state's residential recycling rate is about 14%.

Projected EPR Impacts. We modeled the cost drivers associated with raising Colorado's recycling rate of EPR-covered materials from 14% to 44% using infrastructure capacity assumptions from *Paying It Forward* (Bandhauer et al., 2021). In Colorado, reaching this goal would require significant investments, including:

- one new hub-and-spoke system,
- three additional MRFs,
- more than $50 million in facility upgrades,
- expanded public education, and
- increased access to curbside recycling.

Quick Facts: Colorado

- 2025 Population: **6,012,561**
- % of National Population: **1.8%**
- Residential Recycling Rate: **14%**
- Tons of Recyclable Material Lost to Landfills Annually: **707K**
- % of Population in Multifamily Households: **26%**
- % of Population in Urban Areas: **86%**

Using 2024 IMPLAN data, we estimate these investments would create about 770 temporary jobs across Colorado during the first years of implementation mainly from building and upgrading recycling facilities and equipment. Many of these jobs would be in construction, equipment installation, and manufacturing. The spending would also support hundreds of additional jobs at other businesses as workers and companies buy goods and services. These activities would generate about $84 million in wages, benefits, and business owner income during the initial years, falling to about $23 million as construction tapers. The investments would add about $132 million to Colorado's economy during the initial years of construction and capital investment, then falling to about $33 million additional economic activity during program operations.

Once the new facilities and systems are fully in place, Colorado's EPR program would support about 640 ongoing direct jobs and generate $122 million in million in wages, benefits, and business owner income each year. Operational occupations will include truck drivers, material sorters, customer service representatives, and planners. Each year, expanded recycling activities will contribute $205 million to the state's economy.

Furthermore, the state of Colorado and local communities will receive $13 million in tax revenue annually. These long-term benefits will continue as recycling activity is sustained. **Table 4** below summarizes these impacts.

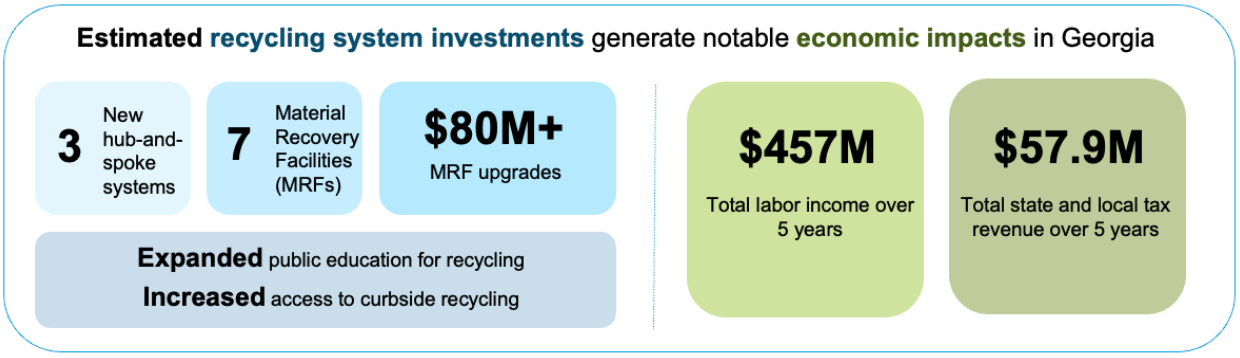
Table 4. Impacts from Investments in Recycling Infrastructure and Annual Operations in Colorado (2026 dollars)

	Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing Operations Years 6-10
Jobs						

	Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing Operations Years 6-10
Direct	770	770	410	410	230	640
Indirect	200	200	90	90	60	420
Induced	270	270	120	120	70	390
Total Jobs	1,240	1,240	620	620	360	1,450
Total Labor Income ($ millions)	$84	$84	$36	$36	$23	$122
Total Value Added ($ millions)	$132	$132	$53	$53	$33	$205
Total State and Local Tax Revenue ($ millions)	$12	$12	$5	$5	$2.4	$13

Georgia

- Reaching a 43% recycling rate requires large-scale expansion: 3 hub-and-spoke systems, 7 new MRFs, >$80M in upgrades, plus education and curbside expansion.
- Expanded EPR could generate approximately 1,510 short-term jobs and $259M economic boost from initial capital expenditures and approximately 1,200 ongoing jobs, $341M annual economic activity, and $21M annual tax revenue.



Georgia's recycling system relies heavily on cart-based curbside programs in urban areas, where participation reaches 72%. By contrast, drop-off programs are less convenient and have lower engagement, with 30% of eligible households participating. Despite a relatively well-developed recycling network, Georgia's residential recycling rate remains low, and large amounts of recyclable material are lost to landfills each year. Among single-family households in Georgia, 38% have access to curbside recycling and 38% have access to drop-off recycling. Access is more limited for multifamily households, with only 19% having recycling services available. Across all households statewide, 38% do not have access to recycling services. At the same time, Georgia has a reasonably strong processing network, including 12 residential MRFs (The Recycling Partnership, n.d.).

Projected EPR Impacts. Under a national EPR framework, we modeled the cost drivers associated with raising Georgia's recycling rate of EPR-covered materials from 13% to 43% statewide. Reaching this goal would require significant investments, including:

- three new hub-and-spoke systems,
- seven additional MRFs,
- more than $80 million in facility upgrades and equipment purchases,
- expanded public education, and
- more access to curbside recycling.

Quick Facts: Georgia

- 2025 Population: **11,302,748**
- % of National Population: **3.3%**
- Residential Recycling Rate: **13%**
- Tons of Recyclable Material Lost to Landfills Annually: **1.3M**
- % of Population in Multifamily Households: **20%**
- % of Population in Urban Areas: **74%**

Using 2024 IMPLAN data, we estimate these investments would create about 1,510 temporary jobs across Georgia during the initial years of EPR implementation, mainly from expanding recycling facilities, equipment, and public education efforts. As workers and companies spend money on goods and services, the investments would also support additional jobs at other businesses. These activities would generate about $154 million in wages, benefits, and business owner income initially, falling to about $35 million as construction and initial program investments taper. The investments would add about $259 million to Georgia's economy during the initial years of heavy capital expenditure, declining to about $55 million in steady-state operations.

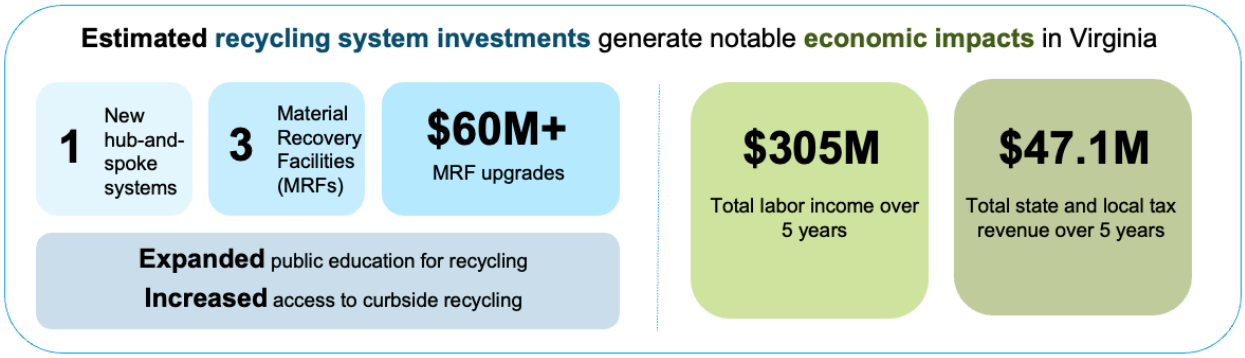
Once the new facilities and systems are fully operational, Georgia's EPR program would support about 1,200 ongoing direct jobs and generate $198 million in wages, benefits, and business owner income each year. Operational occupations will include truck drivers, material sorters, customer service representatives, and planners. Each year, expanded recycling activities will contribute $341 million to the state's economy. Furthermore, the state of Georgia and local communities will receive $21 million in tax revenue annually. These long-term benefits will continue as recycling activity is sustained. **Table 5** below summarizes these impacts.

Table 5. Impacts from Initial Investments in Infrastructure and Education by Year in Georgia (2026 dollars)

	Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing operations Years 6-10
Jobs						
Direct	1,510	1,510	730	730	400	1,200
Indirect	420	420	190	190	120	900
Induced	540	540	200	200	120	690
Total Jobs	2,470	2,470	1,120	1,120	640	2,790
Total Labor Income ($ millions)	$154	$154	$57	$57	$35	$198
Total Value Added ($ millions)	$259	$259	$89	$89	$55	$341
Total State and Local Tax Revenue ($ millions)	$20	$20	$7	$7	$3.9	$21

Virginia

- Increasing recycling to 45% statewide requires one hub-and-spoke system, three new MRFs, >$60M in upgrades to MRFs, and expanded education and curbside access.
- Expanded EPR could generate approximately 1,030 short-term jobs and $152M economic activity in early years of program investment, with 940 ongoing jobs, $279M annual economic contributions, and $19M annual tax revenue.



Context. Virginia's recycling system is decentralized and relies more on subscription-based services than on contracted service models. In more urbanized parts of the state, solid waste planning units, which include cities, counties, and other local government entities, are more likely to offer both curbside and drop-off recycling options. Smaller and more rural localities are more likely to rely on drop-off programs (Virginia Department of Environmental Quality, 2019).

Virginia also has six commingled residential MRFs (The Recycling Partnership, n.d.).[3] Among single-family households in Virginia, 45% have access to curbside recycling and 34% have access to drop-off recycling. Access is more limited for multifamily households, with only 16% having recycling services available. Across all households in Virginia, 35% do not have access to recycling services (Appel et al., 2024). Virginia is a high-loss state in terms of residential recyclable material lost to landfills. Contamination, staffing constraints, and transportation burdens in rural areas all pose challenges for the state's recycling infrastructure. The statewide material acceptance rate is 63% (Appel, et al., 2024).

Quick Facts: Virginia

- 2025 Population: **8,880,107**
- % of National Population: **2.6%**
- Residential Recycling Rate: **15%**
- Tons of Recyclable Material Lost to Landfills Annually: **1.1M**
- % of Population in Multifamily Households: **22%**
- % of Population in Urban Areas: **76%**

Projected EPR Impacts. Under a national EPR framework, we modeled the cost drivers associated with raising Virginia's recycling rate of EPR-covered materials from 15% to 45%. Reaching this goal would require significant investments, including:

- one new hub-and-spoke system,

[3] The Recycling Partnership defines commingled residential MRFs as facilities that accept recyclables, process them as dual- or single-stream materials, and sort them into individual commodities that are sold to market.

- three additional MRFs,
- more than $60 million in facility upgrades and equipment purchases,
- expanded public education, and
- more access to curbside recycling.

Using 2024 IMPLAN data, we estimate these investments would create about 1,030 temporary jobs across Virginia during the initial years, mainly from improving recycling facilities, equipment, and education efforts. The spending would also support additional jobs at other businesses as companies and workers buy goods and services. These activities would generate about $93 million in wages, benefits, and business owner income initially, falling to about $29 million by Year 5 as startup activity slows down. The investments would add about $152 million to Virginia's economy during the initial years of concentrated capital expenditure, declining to about $43 million. In addition, state and local governments would receive more tax revenue from this added economic activity.

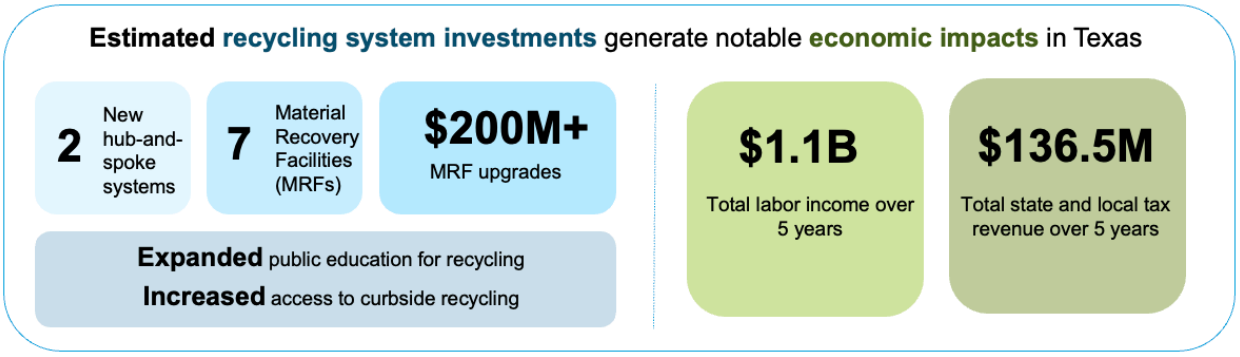
Once the new facilities and systems are fully operational, Virginia's EPR program would support about 940 ongoing direct jobs and generate $160 million in wages, benefits, and business owner income each year. Operational occupations will include truck drivers, material sorters, customer service representatives, and planners. Each year, expanded recycling activities will contribute $279 million to the state's economy. Furthermore, the state of Virginia and local communities will receive $19 million in tax revenue annually. These long-term benefits will continue as recycling activity is sustained.

Table 6. Impacts from Initial Investments in Infrastructure and Education by Year in Virginia (2026 dollars)

	Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing operations Years 6-10
Jobs						
Direct	1,030	1,030	590	590	310	940
Indirect	220	220	130	130	80	560
Induced	270	270	130	130	80	460
Total Jobs	1,520	1,520	850	850	470	1,960
Total Labor Income ($ millions)	$93	$93	$45	$45	$29	$160
Total Value Added ($ millions)	$152	$152	$68	$68	$43	$279
Total State and Local Tax Revenue ($ millions)	$16	$16	$6	$6	$3.1	$19

Texas

- Scaling to a 47% recycling rate requires major investment: 2 hub-and-spoke systems, 7 new MRFs, and >$200M in upgrades, plus education and service expansion.
- Expanded EPR could generate approximately 3,420 short-term jobs and $580M early economic activity. After the initial capital investments, the policy would generate 3,360 ongoing jobs and $1.1B annual economic contribution, alongside $96M in annual tax revenue.



Texas has a robust recycling industry made up of hundreds of public and private organizations that collect and transport recyclable materials from a wide range of sources, including residential curbside and drop-off programs, office buildings, auto shops, and other commercial facilities. The state also has a strong base of end users that rely on recycled feedstocks to manufacture new products, including three fiberglass insulation plants, five paper or paperboard mills, three cellulose product manufacturers, five steel mills, and a variety of plastics converters.

A significant share of Texas-generated MSW recyclables is sorted, processed, and baled through a network of 31 MRFs located in Texas and nearby states. Most of these facilities accept commingled single-stream recyclables, sometimes including glass, and at least one fiber-only MRF operates in the state. Although the state has a large network of MRFs, geographic constraints, contamination rates, and participation levels remain barriers to a stronger recycling system.

Quick Facts: Texas

- 2025 Population: **31,709,821**
- % of National Population: **9.3%**
- Residential Recycling Rate: **17%**
- Tons of Recyclable Material Lost to Landfills Annually: **3.2M**
- % of Population in Multifamily Households: **25%**
- % of Population in Urban Areas: **84%**

Among single-family households in Texas, 56% have access to curbside recycling and 26% have access to drop-off recycling. Access is more limited for multifamily households, with only 20% having recycling services available. Across all households in Texas, 36% do not have access to recycling services. The statewide material acceptance rate is 66% (Appel, et al., 2024). Access to recycling remains uneven across the state, especially in less populated areas where service may be unavailable or limited to drop-off programs, which generally have lower participation because they are less convenient than curbside collection. In more urban areas, multifamily residents may still lack direct service

or may need to rely on community drop-off sites that are difficult to use (Burns & McDonnell, 2021).

Projected EPR Impacts. Under a national EPR framework, we modeled the cost drivers associated with raising Texas's recycling rate of EPR-covered materials from 17% to 47%. Reaching this goal would require significant investments, including:

- two new hub-and-spoke systems,
- seven additional MRFs,
- more than $200 million in facility upgrades and equipment purchases,
- expanded public education, and
- more access to curbside recycling.

Using 2024 IMPLAN data, we estimate these investments would create about 3,420 temporary jobs across Texas during the first 2 years, mainly from expanding recycling infrastructure, buying equipment, and supporting education efforts. The spending would also support additional jobs at other businesses as companies and workers buy goods and services. These activities would generate about $354 million in wages, benefits, and business owner income during the initial years of capital expenditure, falling to about $96 million as initial investment activity tapers. The investments would add about $580 million to Texas's economy during the initial years of investment, declining to about $147 million.

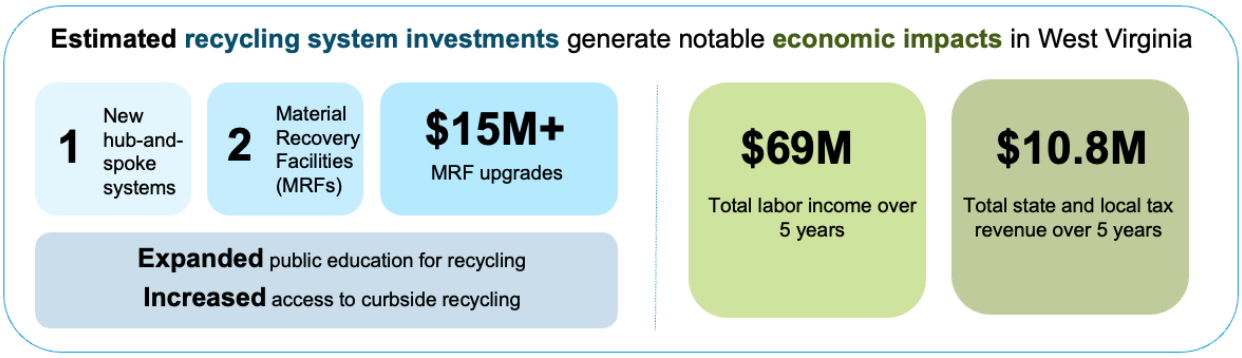
Once the new facilities and systems are fully operational, Texas's EPR program would support about 3,360 ongoing direct jobs and generate $667 million in wages, benefits, and business owner income each year. Operational occupations will include truck drivers, material sorters, frontline supervisors, and mechanics. Each year, expanded recycling activities will contribute $1.1 billion to the state's economy. Furthermore, the state of Texas and local communities will receive $96 million in tax revenue annually. These long-term benefits will continue as recycling activity is sustained. **Table 7** summarizes these impacts.

Table 7. Impacts from Initial Investments in Infrastructure and Education by Year in Texas (2026 dollars)

	Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing operations Years 6-10
Jobs						
Direct	3,420	3,420	2,020	2,020	1,060	3,360
Indirect	970	970	500	500	290	2,590
Induced	1,210	1,210	570	570	330	2,280
Total Jobs	5,600	5,600	3,090	3,090	1,680	8,230
Total Labor Income ($ millions)	$ 354	$354	$166	$166	$96	$667
Total Value Added ($ millions)	$ 580	$580	$255	$255	$147	$1,192
Total State and Local Tax Revenue ($ millions)	$45	$45	$19	$19	$8.5	$96

West Virginia

- Increasing recycling by 30 percentage points statewide requires one hub-and-spoke system, three new MRFs, >$60M in upgrades to MRFs, and expanded education and curbside access.
- Expanded EPR could generate approximately 1,030 short-term jobs and $152M economic activity in early years of program investment, with 360 ongoing jobs, $42M annual economic contributions, and $3M annual tax revenue.



West Virginia's waste management infrastructure includes 16 landfills and 17 transfer stations. Seven of the landfills are publicly owned, while the remaining facilities are privately operated. The state also has 31 materials processing centers comprised of recycling drop-off centers and cross-county regional processing centers for public and private recyclers (West Virginia Solid Waste Management Board, 2025).

Quick Facts: West Virginia

- 2025 Population: **1,766,147**
- % of National Population: **0.5%**
- Residential Recycling Rate: **10%**
- Tons of Recyclable Material Lost to Landfills Annually: **259K**
- % of Population in Multifamily Households: **12%**
- % of Population in Urban Areas: **51%**

Among single-family households in West Virginia, 25% have access to curbside recycling and 59% have access to drop-off recycling. Access is more limited for multifamily households, with only 6% having recycling services available. Across all households in West Virginia, 32% do not have access to recycling services (Appel, et al., 2024).

West Virginia is a low-loss state in terms of residential recyclable material lost to landfills, but it is also characterized by a low recycling rate. The state's recycling infrastructure is constrained by its many low-density population areas. In these areas, collecting all types of waste is more expensive, and those costs have risen further in recent years as operating expenses have increased. Smaller recycling facilities are often forced to store materials until they accumulate enough volume to fill a truckload, which can mean lightweight materials such as plastics remain on site for a year or longer. Because recycling is only marginally profitable without sufficient volume, facilities must also maintain clean material streams to achieve the best possible market value.

Projected EPR Impacts. Under a national EPR framework, we modeled the cost drivers associated with raising West Virginia's recycling rate of EPR-covered materials from 10% to 40%. Reaching this goal would require significant investments, including:

- two new hub-and-spoke systems,
- two additional MRFs,
- more than $15 million in facility upgrades and equipment purchases,
- expanded public education, and
- more access to curbside recycling.

Using 2024 IMPLAN data, we estimate these investments would create about 310 temporary jobs across West Virginia during the initial years of policy implementation, mainly from expanding recycling infrastructure, buying equipment, and supporting education efforts. The spending would also support additional jobs at other businesses as companies and workers buy goods and services. These activities would generate about $25 million in wages, benefits, and business owner income initially, falling to about $5 million as startup activity slows down. The investments would add about $38 million to West Virginia's economy initially, declining to about $7 million.

Once the new facilities and systems are fully operational, West Virginia's EPR program would support about 190 ongoing direct jobs and generate $25 million in wages, benefits, and business owner income each year. Operational occupations will include truck drivers, material sorters, frontline supervisors, and mechanics. Each year, expanded recycling activities will contribute $42 million to the state's economy. Furthermore, the state of West Virginia and local communities will receive $3 million in tax revenue annually. These long-term benefits will continue as recycling activity is sustained.

Table 8. Impacts from Initial Investments in Infrastructure and Education by Year in West Virginia (2026 dollars)

	Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing operations Years 6-10
Jobs						
Direct	310	310	135	135	80	190
Indirect	60	60	25	25	15	100
Induced	70	70	20	20	10	70
Total Jobs	440	440	180	180	105	360
Total Labor Income ($ millions)	$25	$25	$7	$7	$5	$25
Total Value Added ($ millions)	$38	$38	$11	$11	$7	$42
Total State and Local Tax Revenue ($ millions)	$4	$4	$1	$1	$0.8	$3

Conclusion

The findings indicate that EPR could do more than transfer recycling costs from municipalities to producers. It could stimulate infrastructure and innovation spending, expand employment, reduce some municipal expenditures, and improve administrative efficiency through harmonization. The economic value ultimately realized in the United States will depend on whether EPR investments translate into sustained improvements in recycling access, participation, processing performance, material quality, and end-market demand—and whether policy design avoids unnecessary fragmentation for the producers responsible for financing the system.

References

Appel, M., Francis, Payne, A., Tanimoto, A., & Mouw, S. (2024). *The state of recycling: The present and future of residential recycling in the U.S.* The Recycling Partnership. https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2024/05/SORR_Methodology-1-1.pdf

Bandhauer, K., Harrison, K., & Mouw, S. (2021). *Paying it forward: How investments in recycling will pay dividends.* The Recycling Partnership Inc. https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2021/05/Paying-It-Forward-5.18.21-final.pdf

Bartlett, V., Seidel, C., & Gies, G. (2016). *Assessment of the economic and environmental impacts of extended producer responsibility programs in British Columbia* (Report No. 5160206). British Columbia Ministry of Environment. https://www2.gov.bc.ca/assets/gov/environment/waste-management/recycling/recycle/rel-res/2014_assessment_of_economic_environmental_impacts_of_extd_producer_responsibility_programs_bc.pdf

Basuhi, R., Bhuwalka, K., Roth, R., & Olivetti, E. A. (2024). Evaluating strategies to increase PET bottle recycling in the United States. *Journal of Industrial Ecology, 28*(4), 916–927. https://doi.org/10.1111/jiec.13496

Bold Reuse. (2026). *2026 reuse benchmark report: Sports and entertainment venues leading the circular economy*. https://22677109.fs1.hubspotusercontent-na2.net/hubfs/22677109/Bold%20Reuse%202026%20Reuse%20Benchmark%20Report%20for%20Sports%20%26%20Entertainment.pdf

Bose, S. (2022). *Economic impacts to consumers from extended producer responsibility (EPR) regulation in the consumer packaged goods sector*. Columbia Climate School. https://doi.org/10.7916/n2af-vv87

Brown, A., Laubinger, F., & Börkey, P. (2023). *New aspects of EPR: Extending producer responsibility to additional product groups and challenges throughout the product lifecycle*. OECD Environment Working Papers, No. 225. OECD Publishing. https://doi.org/10.1787/cfdc1bdc-en

Burns & McDonnell. (2021). *Recycling market development plan.* https://www.tceq.texas.gov/assets/public/assistance/P2Recycle/Recyclable-Materials/2021%20Recycling%20Market%20Development%20Plan.pdf

Circular Action Alliance, HDR, Eunomia, & Cowman, W. (2025). *Colorado needs assessment*. Prepared for Colorado's Producer Responsibility Program for Statewide Recycling. https://static1.squarespace.com/static/64260ed078c36925b1cf3385/t/6799420fed5d6f0caf9b978f/1743456731209/Needs+Assessment+Full+Report+2025.pdf

City of Thornton. (2025). *Annual comprehensive financial report for the fiscal year ended December 31, 2025.* Finance Department.

Closed Loop Partners. (2025). *Petaluma reusable cup project: Results report*. https://www.closedlooppartners.com/wp-content/uploads/2025/02/Petaluma-Reusable-Cup-Project-Results-Report.pdf

Colorado Department of Public Health and Environment. (2026). *Colorado Waste Diversions Totals* [Dataset]. https://cdphe.colorado.gov/hm/colorado-recycling-totals

Department for Environment – United Kingdom, Food & Rural Affairs. (2024). *Introducing extended producer responsibility for packaging (pEPR): Final impact assessment*. https://www.legislation.gov.uk/ukia/2024/152/pdfs/ukia_20240152_en.pdf

Edwards, S., & Stoner, R. (2022). *Extended producer responsibility for packaging.*

Environmental Research & Education Foundation. (2026). *Analysis of MSW Landfill Tipping Fees—2025*. Environmental Research & Education Foundation. Retrieved www.erefdn.org

Eunomia. (2021). *Extended producer responsibility for packaging: Elements and outcomes.* https://eunomia.eco/reports/extended-producer-responsibility-for-packaging/

Fiedler, K. C., Ezekiel, M., Vasicsek, R., Felix, C., Lee, D. L., Thompson, H., Gosliner, W., Heiges, J., Willits, S., Madsen, K., & Ritchie, L. D. (2025). Lessons learned from reusable serviceware implementation in school lunch in a California school district: A qualitative exploration of school staff and parents' perceptions. *Journal of Child Nutrition & Management, 49*(1). https://schoolnutrition.org/wp-content/uploads/2025/05/JCNM-Spring-2025-Implementation-Serviceware.pdf

IMPLAN® model, 2020 Data and 2024 Model, using inputs provided by The Recycling Partnership, RTI International, and IMPLAN Group LLC, IMPLAN System [data and software].

Indiana Department of Environmental Management. (2026). *Recycling Activity Report Database* [Dataset]. https://www.in.gov/idem/recycle/recycling-activity-reporting/

Kim, J. H. (2012). Extended producer responsibility (EPR) and job creation in Korea. In V. Popv, H. Itoh, & C. A. Brebbia (Eds.), *Waste management and the environment VI* (pp. 75-82). WIT Press.https://books.google.com/books?hl=en&lr=&id=-r1VLwWpg78C&oi=fnd&pg=PA75&dq=epr+impacts+on+jobs+korea&ots=rBR33uN18R&sig=Sp3WkaCQ1PXr-L-cB6LSoW695iohttps://books.google.com/books?hl=en&lr=&id=-r1VLwWpg78C&oi=fnd&pg=PA75&dq=epr+impacts+on+jobs+korea&ots=rBR33uN18R&sig=Sp3WkaCQ1PXr-L-cB6LSoW695io

Laubinger, F., Brown, A., Dubois, M., & Börkey, P. (2021). *Modulated fees for extended producer responsibility schemes (EPR)* (OECD Environment Working Papers No. 184). OECD Publishing. https://doi.org/10.1787/2a42f54b-en

Mallick, P. K., Salling, K. B., Pigosso, D. C. A., & McAloone, T. C. (2024). Designing and operationalising extended producer responsibility under the EU Green Deal. *Environmental Challenges, 16*, 100977. https://doi.org/10.1016/j.envc.2024.100977

National Association for PET Container Resources. (2025, December 10). *2024 PET recycling report: Executive summary*. Organization for Economic Co-operation and Development. (2004). *Economic aspects of extended producer responsibility*. https://doi.org/10.1787/9789264105270-en

Quinn, M. (2025, December 15). Virginia seeks solid waste plan feedback on circular economy, EPR and data. *Waste Dive.* https://www.wastedive.com/news/virginia-seeks-solid-waste-plan-feedback-circular-economy-epr-data/807895/

Rubio, S., Ramos, T, Leitão, M., & Barbosa-Povoa, A. (2019) Effectiveness of extended producer responsibility policies implementation; The case of Portuguese and Spanish packaging waste systems. *Journal of Cleaner Production, 210*, 217-230. https://doi.org/10.1016/j.jclepro.2018.10.299

Smith, R. L., Takkellapati, S., & Riegerix, R. C. (2022). Recycling of plastics in the United States: Plastic material flows and polyethylene terephthalate (PET) recycling processes. *ACS Sustainable Chemistry & Engineering, 10*(6), 2084–2096. https://doi.org/10.1021/acssuschemeng.1c06845

Systemiq. (2024). *Plastic treaty futures.* https://www.systemiq.earth/reports/downloads/Systemiq-Plastic_Treaty_Futures_EN.pdf

The Recycling Partnership. (n.d.). *Map of commingled residential MRFs in the U.S.* https://recyclingpartnership.org/residential-mrfs/

The Recycling Partnership. (2023). *Increasing recycling rates with EPR policy: How extended producer responsibility law for packaging and printed paper creates high-performing recycling programs*. https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2023/02/Recycling-Partnership-EPR-Policy-Report-final.pdf

The Recycling Partnership. (2024). *State of residential recycling in Georgia.* https://georgiarecycles.org/wp-content/uploads/2024/04/Recycling-Partnership-Presentation-to-Georgia-Recycling-Coalition-4-30-24-3.pdf

Tumu, K., Vorst, K., & Curtzwiler, G. (2023). Global plastic waste recycling and extended producer responsibility laws. *Journal of Environmental Management, 348*, 119242. https://doi.org/10.1016/j.jenvman.2023.119242

UK Department for Environment, Food & Rural Affairs. (2024). Introducing extended producer responsibility for packaging (pEPR): Final impact assessment. https://www.legislation.gov.uk/ukia/2024/152/pdfs/ukia_20240152_en.pdf

U.S. Census Bureau. (2025). *2022 SUSB annual data tables by establishment industry* [Data set]. Retrieved from Census SUSB Data Tables [1, 2]

U.S. Census Bureau. (2026a). *Thornton, CO*. U.S. Census Bureau. Census Reporter. https://censusreporter.org/profiles/16000US0877290-thornton-co/

U.S. Census Bureau. (2026b). *Household Type by Units in Structure* [Dataset]. American Community Survey. https://data.census.gov/table/ACSDT5Y2016.B11011?q=Miami+County,+Indiana&t=Units+and+Stories+in+Structure

U.S. Environmental Protection Agency. (2024). *An assessment of the U.S. recycling system.* https://www.epa.gov/system/files/documents/2024-12/financial_assessment_of_us_recycling_system_infrastructure.pdf

U.S. Environmental Protection Agency. (2020, December). *Advancing sustainable materials management: 2018 fact sheet—Assessing trends in materials generation and management in the United States*. https://www.epa.gov/sites/default/files/2021-01/documents/2018_ff_fact_sheet_dec_2020_fnl_508.pdf

U.S. Environmental Protection Agency. (2016). *Advancing Sustainable Materials Management: 2016 Recycling Economic Information (REI) Report Methodology.* *https://www.epa.gov/sites/default/files/2017-06/documents/final_epa_2016_rei_methodology_0.pdf*

Virginia Department of Environmental Quality. (2019). *Recycling in Virginia: An evaluation of recycling rates and recommendations.* https://rga.lis.virginia.gov/Published/2019/SD7/PDF

Voloschuk, C. (2026, February 16). *A "pivotal moment" for recycled PET*. Recycling Today. https://www.recyclingtoday.com/news/a-pivotal-moment-for-recycled-pet-plastic-the-recycling-partnership/

Walls, M. (2006, March). *Extended producer responsibility and product design: Economic theory and selected case studies* (Discussion Paper RFF DP 06-08). Resources for the Future.

West Virginia Solid Waste Management Board. (2025). *West Virginia solid waste management plan.*

Appendix A: Detailed Methodologies, Assumptions, and Supporting Data by Analysis

Core Methodology, Assumption, and Data

This appendix includes methodologies, key assumptions, and core data inputs used to develop the analyses included in this report. It also includes supplementary results that underlie the summary results presented in the main body of this report.

Estimating the Impact of National EPR Framework

A key outcome, among several, associated with EPR policies is increased recycling activity. We anchor our analysis on recycling rates as a measure of recycling activity and overall impact of the EPR policy. Recycling rates represent a near-term measure that is closely linked with observed changes in international EPR precedents, though there are additional circularity goals associated with EPR, including overall reduction of material use, reuse/refill, and reduced environmental impacts, post-consumer recycled (PCR) content, establishment of end-markets and others. Additionally, recycling rates and associated material flow of EPR-covered materials are associated with some of the largest investments of recycling systems, including the infrastructure for materials collection, sorting, and processing.

For this analysis, we assume a simple and conservative average increase of 30 percentage point in target material recycling rate by state across a 10-year implementation horizon. We benchmark this rate using examples drawn from The Recycling Partnership's *Increasing Recycling Rates with EPR Policy* (The Recycling Partnership, 2023). Our rationale behind this assumption is based on the following: (a) 30-percentage-point increase in recycling rates represents an approximated average of the cases where EPR has been implemented, noting the wide min/max by context, and that an exponential relationship exists in the increase of recycling rates over the 10-year period, with slow gains initially that dramatically increase over time, (b) this approach preserves existing state-level capacity and infrastructure baselines by representing a percentage point increase from each state's unique starting place, and (c) it is a simple and transparent approach assumption to guide the estimation of a hypothetical policy impact that has not yet been implemented in full in any U.S. state or region.

Many factors define an EPR policy. Although each can influence outcomes, not all need to be specified for our analyses. In **Table A-1**, we highlight the components of EPR policy most critical to our modeling.

Estimating Waste Flows Under a National EPR Framework

This analysis applies an integrated modeling approach to estimate the system-level and economic impacts of a hypothetical national EPR framework. The core analytical framework links a waste flow model with infrastructure and economic impact modeling to translate changes in recycling performance into investment needs and associated economic outcomes. The waste flow model provides a quantitative foundation for estimating baseline MSW generation, current recycling activity, and projected recycling increases under an EPR scenario, and is designed as a policy scenario tool to assess the scale and direction of potential system changes rather than to predict exact facility siting or implementation pathways.

Table A-1. Details Associated with a Hypothetical National EPR Framework

Components	Working Definitions	Specifics	Assumptions and Implications in Economic Analyses
Policy scope	What materials are covered, obligated parties	EPR system covers consumer packaging and printed paper products, with limited exceptions. All non-*deminimis* producers of covered products must comply.	Model assumes clearly defined set of covered materials with a focus on packaging and packaging components, food packaging, and paper products (using definition from the Minnesota EPR).
System finance / cost recovery	Which parts of the system producers must fund	Producers are responsible for funding the full cost of the covered materials management system.	Producers fund all aspects of collection, sorting, reuse, recycling, education and outreach, enforcement, contract management, and end-market development, displacing local government costs. To clarify impact, analyses will calculate total municipal savings from EPR as taxpayer benefits, regardless of friction for reducing taxpayer burden.
Performance targets	Material-specific and overall targets and timelines	Program sets overall performance objectives and material-specific goals. Targets and timelines are achievable and responsive to infrastructure capacity.	Economic scenarios reflect phased performance improvements rather than immediate step-changes—specifically, we assume a ramp up to 30 percentage-point increase in recycling rate over baseline over a 10-year period for covered materials. Many potential benefits of an EPR framework—including packaging optimization, reuse and refill systems, increased PCR content, material use reduction, and other circular economy outcomes—were not quantified in this analysis because of limited available data and the study's focus on jobs and recycling infrastructure investment. A national EPR framework could establish consistent methodologies for setting and measuring performance targets, which may include metrics related to material efficiency including reduction, reuse/refill, recycled content, recycling performance, and other policy objectives.
Producer fee structure	How fees are set (weight, material, format)	Producer fees are set using transparent cost-recovery principles, typically based on material type, weight, and packaging format.	Producer fees are **not** calculated nor accounted for in the macroeconomic calculations presented. The analyses that use fees in its scenario focuses on producers' response to fees by investments in (a) innovation, and (b) compliance. For this scenario, we asked producers to

Components	Working Definitions	Specifics	Assumptions and Implications in Economic Analyses
			report their related investment in these activities based on the existing EPR policies in place in the United States (seven at the time of writing in 2026).
Eco-modulation rules and innovation incentives	What packaging attributes change fees	The PRO adjusts producer fees to incentivize circular design, increasing fees for problematic or hard-to-recycle materials and reducing fees for circular attributes.	Eco-modulation is represented as fee differentials tied to packaging attributes (e.g., reuse/refill, recyclability, PCR). We assume that eco-modulation is adequately incentivized by EPR rules and frameworks such that producers will invest in product adaptations to meet the assumed 30 percentage point increase in recycling rate. Additionally, we include producer investments in innovation, which are modeled from producer estimates. To gather this information, we asked producers to report their related investment in activities based on the EPR policies in place in the United States (seven at the time of writing in 2026.)
PRO model	Whether producers comply individually or by a PRO; how costs are allocated	Producers comply collectively through a single PRO at the state level using nationally consistent rules.	Analyses assume that a national framework for EPR would support a harmonized set of national rules from state-level PROs (one per state). Program administration costs are not included in macroeconomic estimates and it is likely that additional jobs would be included to coordinate producers and run the EPR program.
End-markets	Support for and creation of viable circular markets	The EPR system provides funding for responsible, domestic end-markets for recycled materials.	Model assumes that end-markets develop and move in line with recycling rate targets but were outside the scope of the analyses and not explicitly modeled in any of the outcomes. We assume that the first 10 years of policy implementation will include investment in and development of viable, responsible, domestic end-markets that are driven by domestic incentives for using recycled content. We do not assume that these markets will drive widespread economic activity initially but will supply and support producers (i.e., do not constrain) in complying with the law.

This analysis applies an integrated modeling approach to estimate the system-level and economic impacts of a hypothetical national EPR policy. The core analytical framework links a waste flow model with infrastructure and economic impact modeling to translate changes in recycling performance into investment needs and associated economic outcomes. The waste flow model provides a quantitative foundation for estimating baseline municipal solid waste (MSW) generation, current recycling activity, and projected recycling increases under an EPR scenario, and is designed as a policy scenario tool to assess the scale and direction of potential system changes rather than to predict exact facility siting or implementation pathways.

The modeling approach follows a sequential structure. First, total MSW generation is estimated at the state level using population data and an EPA-based per capita waste generation rate, providing a consistent baseline across states. Total waste is then disaggregated into nine material categories (e.g., paper, plastics, glass, metals, organics) using national composition factors, allowing the analysis to capture variation in material flows. Current recycling levels are estimated by applying state-level residential recycling rates to total MSW generation, producing an estimate of recycled tonnage across residential, commercial, and institutional sectors. This establishes a baseline measure of system performance against which future changes can be assessed.

The 30 percentage point increase to state-level recycling rates is applied relative to each state's baseline recycling rate, preserving differences in starting conditions while enabling consistent cross-state comparison. The resulting increase in recycled tonnage is compared to baseline recycling levels to calculate the "recycling gap," representing the additional material that must be collected, sorted, and processed under the EPR scenario.

Infrastructure requirements are derived by translating the recycling gap into estimates of additional material recovery capacity. The model estimates the need for new or expanded MRFs, distinguishing between urban and rural contexts to reflect differences in population density, infrastructure access, and transportation logistics. It also identifies broader system investments required to support higher recycling performance, including collection systems, transfer capacity, sorting upgrades, contamination reduction measures, and public education. These estimates represent capacity-based requirements rather than specific facility siting decisions, recognizing that new capacity may be met through a mix of new construction, facility expansion, and operational improvements.

Several key assumptions shape the analysis:

- Waste generation is assumed to remain constant over the 10-year period, meaning that changes in recycling outcomes are driven by improvements in system performance rather than changes in total waste generation. Waste generation data are dated and highly limited by the data available, the best of which are historical EPA data from 1960–2018, which we use to establish waste growth rates and project a 2026 waste generation rate from this trend.
- We assume that EPR policy will drive a 30-percentage-point increase in recycling rates, which is applied uniformly across states. This provides a consistent benchmark, however it does not capture unique gains that might variation in regional infrastructure sharing or dynamic changes in consumption and packaging, as well as in policy effectiveness or infrastructure readiness.
- The model assumes significant improvements in MRF capacity utilization over time, reflecting enhanced efficiency and financed via increased investment from EPR programs. We recognize that this simplifies complex, real-world operational, and financial constraints.

- MRF capacity and infrastructure is assumed to be at 56% per EPA *Facts and Figures*, suggesting that meaningful capacity increases up to a limit of 95% over 10 years could help to supplement recycling infrastructure capacity. Infrastructure calculations are based on capacity requirements, not on exact geographical siting decisions. We assume a daily MRF capacity of approximately 200 tons per day.
- State MSW is estimated using population as a proxy due to a lack of consistent state data. Residential recycling rates are applied to total MSW (residential, commercial, and institutional), significantly broadening the scope of this analysis beyond residential-only estimates.

Sensitivity analysis is conducted to test how results change under lower recycling gains, providing a range of potential outcomes. Model outputs are also validated against available national benchmarks, with differences primarily attributable to scope, particularly the inclusion of commercial and institutional waste in this analysis. Finally, several limitations should be considered.

Taxpayer Savings Analysis

For each locality, the analysis draws on waste management cost and volume data, including separate estimates for recycling and landfill costs and tonnage. A baseline scenario assumes recycling rates change only slightly over the next 10 years aligned to projected population growth. This baseline is compared to an EPR scenario that uses the same population projections but assumes a 30 percentage point increase in the recycling rate over 10 years due to the assumed increase in recycling that EPR may generate. The difference between the two scenarios is used to estimate changes in waste flows and resulting local government cost savings under EPR.

Calculation of Thornton's EPR savings begins with current waste and recycling volumes reported in the city's 2024 comprehensive financial report (City of Thornton, 2025). Historical waste flow data from 2017 to 2024 show that Thornton's total waste volume has steadily increased while its recycling rate has remained relatively flat at 12%–13%. To project future waste volumes, the analysis uses historical Census population data for Thornton, which shows consistent growth over the past decade (Census Bureau, 2026a). The city's average annual population growth rate over this period, 2.4%, was then applied to project MSW volumes through 2036.

Thornton's comprehensive financial report also provides total MSW management expenditures but does not disaggregate costs by landfill and recycling activities. These costs were estimated using Thornton's reported hauling costs, average Colorado landfill tipping fees from the Environmental Research & Education Foundation, and average Colorado MRF costs from the Circular Action Alliance Colorado EPR Needs Assessment (Circular Action Alliance et al., 2025; Colorado Department of Public Health and Environment, 2026; Environmental Research & Education Foundation, 2026). Together, these sources estimated Thornton's landfill and recycling costs, consistent with the city's reported 2024 waste management expenditures.

Miami County's EPR savings analysis similarly uses observed waste flow data. Indiana reports waste flows by end destination statewide, including county-level disaggregation, allowing landfill and recycling volumes to be obtained for Miami County from 2021 to 2024 (Indiana Department of Environmental Management, 2026). No growth projection was applied to Miami County's baseline recycling rate or total MSW volume, an assumption supported by Census data showing no growth in the county's household count over the past decade, as well as Miami County reports indicating stagnant recycling levels over the same period (Census Bureau, 2026b).

Miami County reports only total expenditures for its recycling program. To estimate actual recycling service costs, the analysis applies the estimated share of recycling service costs relative to total recycling program costs from Thornton. Reported per-ton hauling costs from Thornton and average Indiana landfill tipping fees from the Environmental Research & Education Foundation were then used to estimate Miami County's total MSW disposal costs.

Final estimates assume that EPR increases the recycling rate by 30 percentage points between 2026 and 2036. Because the analysis simplifies MSW management into two waste streams—landfill and recycling—a proportion of total MSW is gradually shifted from landfill to recycling over the projection period for both localities. Annual cost estimates are then calculated by applying constant per-ton landfill and recycling costs to the projected waste volumes in each stream. Under the EPR scenario, savings accrue from both the transfer of recycling costs to producers and the reduction in landfill disposal costs as more MSW shifts into recycling. Full estimates of annual MSW costs for both localities with and without EPR are shown in Table A-2.

Key Assumptions:

- Waste streams in this analysis were simplified to include only landfill disposal and recycling. Although actual waste management costs were obtained from both localities, outside estimates were needed to develop projectable per-ton costs for hauling, landfill tipping, and MRF tipping.
- Landfill tipping fees are assumed to be constant over the period of analysis. All costs are kept constant in 2026 dollars.
- Because Miami County did not show a clear trend in population growth or recycling growth, the baseline scenario does not project changes in total MSW volume or the recycling rate. Thornton, CO, showed a slight decline in its recycling rate over the past decade, from 13% to 12%, but this decline was not carried forward in the baseline projection.

Table A-2. Municipal Budget Costs in Millions of U.S. Dollars by Year, with National EPR and Without (Thornton, CO, and Miami County, IN)

Municipality	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Thornton without EPR	$4.25	$4.35	$4.45	$4.56	$4.66	$4.77	$4.88	$5.00	$5.11	$5.23	$5.36
Thornton with EPR	$2.99	$2.94	$2.82	$2.68	$2.56	$2.48	$2.44	$2.43	$2.44	$2.47	$2.51
Miami County without EPR	$1.40	$1.40	$1.40	$1.40	$1.40	$1.40	$1.40	$1.40	$1.40	$1.40	$1.40
Miami County with EPR	$1.08	$1.03	$0.97	$0.90	$0.83	$0.79	$0.76	$0.74	$0.72	$0.71	$0.71

Jobs Associated with EPR-Related Infrastructure Investment

RTI used the investment framework presented in Bandhauer et al. (2021) as data inputs to a series of customized national IMPLAN input-output (I-O) models to capture impacts associated with each facet of investment. **Table A-3** depicts these investments by type.

Input-output analysis is a well-known and reliable methodology for estimating the total impacts associated with new investment, policy changes, and other events. The framework and methodological basis for the IMPLAN model is derived from the U.S. Department of Commerce's Benchmark Input-Output (I-O) Accounts. The I-O accounts provide detailed information on the flows of the goods and services that make up the production processes of industries. The benchmark tables depict how spending in one industry affects others. These relationships determine how regional economies may respond to specific economic events.

Specifically, we used IMPLAN[1] model year 2024 for the United States to conduct this analysis. A single model was constructed for each investment activity proposed in the report. These activities consisted of expanding recycling collection, construction of new MRFs, renovation of existing MRFs, additional spoke-and-hub systems, household education about recycling, and new equipment that will allow MRFs to recycle plastic films. Each of these activities will stimulate an increase in demand for goods and services. This spending generates wages for workers in a range of industries and creates revenue, profits, and wages in the sectors that supply goods and services to recycling facilities. The analysis also captures associated employment impacts and increased household spending that result from activity across the waste management supply chain. Combined, these models estimate the total economic impact of systematic investments in the recycling industry.

IMPLAN models estimate three kinds of results:

- **Direct effects:** These effects represent the economic activity that will occur when the investments documented in this report are undertaken. Examples include capital expenditures on facilities, recycling carts, education, and equipment.
- **Indirect effects:** Also called supply chain effects, indirect effects capture economic activity among businesses that supply goods and services to the recycling industry, businesses that supply those suppliers, and so forth.
- **Induced effects:** Also referred to as household spending effects, induced effects result from employees whose wages are supported by recycling industry expenditures, directly and indirectly, spending their wages in the local economy on food, transportation, housing, and other living expenses.

Four common measures of economic impact can be used to summarize the national impact of expanding recycling infrastructure:

- **Employment:** Consists of all full-time, part-time, and temporary positions. Jobs are reported as an annual average.
- **Labor income:** Represents all forms of employee compensation, including wages and benefits and proprietor income.
- **State GDP:** Provides an indicator of the labor, capital, and tax income generated from production activities. Also referred to as "value-added." States use GDP to describe the overall size of specific industries and the economy.
- **State and local tax revenues:** Provides an indicator of the value of state and local taxes that will be generated in economies across the country as recycling infrastructure is placed in service.

RTI used the following assumptions in the analysis:

[1] For more information on the IMPLAN modeling process, visit Implan.com

- TRP values appear to be in 2020 dollars. We have used IMPLAN's built-in inflation adjustment function to inflate these to 2026 dollars. IMPLAN relies on actual historic inflation by commodity, so the inflation rate varies by good.
- We have adjusted the number of households in the analysis from 120.7 million, drawn from Bandhauer et. al (2021) to 134.8 million, which is the number reported in the preliminary 2025 Census information.[2] Estimates that were based on specific numbers of households were inflated by 11.7% to account for growth in households. RTI uses TRP assumptions about the share of households that are single- versus multifamily.
- We translated investments into IMPLAN industries and commodities. Each section clearly identifies which industry, commodity, or bundle of commodities was used in the analysis.
- Purchasing and construction activities will be done in project Years 1 and 2, except for investment in plastic film recycling and household education activities.
- We assume communities place new infrastructure on land that is already owned by the local government. Thus, purchases of real estate for new infrastructure are not included in the model.
- TRP's report estimated the impact of expanding residential recycling capacity. This is not identical to implementing an EPR system in the United States. For example, creation of an EPR system would lead to companies reformulating their packaging to reduce potential waste, whereas this impact would not necessarily be associated with expansion of residential recycling capacity. However, we believe these estimates correctly capture the size and nature of investments that would be needed to implement EPR.
- This report does not consider the following: the reductions in economic activity that may result from EPR adoption (for example, implementation of EPR may lower virgin plastic production, other forms of waste management, and divert public and private funding away from other activities); the introduction of new or enhanced recycling infrastructure, including advanced automation, in MRFs and collection depots.

Table A-3. The Recycling Partnership's Estimate of New Capital by Program Component

Component	Capital Needs (2020 $ billions)	Percent of Total
Collection Investment including Hub-and-Spoke	$4.123	24%
New MRF Investment	$.998	6%
MRF Upgrades	$1.539	9%
Hub-and-Spoke Transfer	$0.059	3%
Education and Engagement for Material Quality and Optimized Recovery	$6.038	35%
Film and Flexible Packaging Collection and Processing	$4.086	23%
Total	**$16.843**	**100%**

[2] U.S. Census Bureau. *2025 Current Population Survey Table HH-1. Households by Type: 1940 to present.* hh1.xls

Collection Infrastructure

The component of expanding recycling infrastructure focuses on three distinct activities: expanding curbside access, increasing access to recycling for multifamily households, and upgrading off-site drop-off facilities.

a. Cart-Based Collection

Expanding cart-based collection is key to expanding curbside recycling access that utilizes efficient best management practices. Investment in this collection type requires investment in collection carts and bins as well as new trucks with automated collection capabilities.

The envisioned investment in an expanded curbside system would consist of:

- Converting 2.5 million households currently with no access to cart-based collection
- Converting 4.2 million households currently with off-site drop-off to cart-based collection
- Providing new carts to 3.6 million current curbside-subscribing households

  Achieving full cart-based subscription of curbside service for 16.9 million current non-subscribers

  Converting 4.8 million automatically served households from bin- or bag-based collection to carts
- Providing a second bin to 6 million households that will likely stay in bin-based collection

Table A-4 details these investments and their costs.

Table A-4. Investment in Cart-Based Collection

Description	Units Needed	Cost per Unit	Total Cost
Carts for expanding access	35,790,201	$50	$1,798,457,614
Plastic bins	6,743,015	$8	$53,944,120
Trucks	3,462	$300,000	$1,038,624,000
Total			**$2,891,025,735**

Note: The units needed have been increased by 11.7% over the values estimated by TRP in 2021 to account for growth in the number of households.

To estimate these impacts, we modeled an increase in demand for three different commodities in IMPLAN. The total cost for carts was allocated to commodity 3253, “carts, lawn and garden type.” Plastic bins were represented by commodity code 3185, all other plastic products. Finally, recycling collection trucks are represented by IMPLAN commodity code 3325, heavy-duty trucks. **Table A-5** presents the total impact of this spending.

Table A-5. Economic Impacts of Cart-Based Collection

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	13,800	$1,009	$1,912	$305
Indirect	7,600	$700	$1,189	$90
Induced	10,400	$752	$1,414	$134
Total	**31,800**	**$2,461**	**$4,514**	**$529**

b. Multifamily Housing

Multifamily housing is a consistently underserved sector with respect to recycling access. The varied nature of multifamily properties requires different approaches to increasing recycling access depending on the property type. The three main categories of multifamily properties are high-rise buildings, mid-rise buildings, and garden-style buildings. The three types of collection methods that could serve these properties are compacting roll-offs, front-end containers, and carts.

For this analysis, we assumed that garden-style buildings would be served by carts and other forms of multifamily housing would be served by compacting rolls-offs and front-end dumpsters. We allocated $846 million to dumpsters, IMPLAN commodity code 3236 (other metal container manufacturing), $276 million to carts (3253 “carts, lawn and garden type”), and $134 million to plastic totes (3185, all other plastic products). $341 million is invested in new heavy-duty trucks. This investment is summarized in **Table A-6**.

Table A-6. Investment in Multifamily Collection

Description	Units Needed	Cost per Unit	Total Cost
Dumpsters			$846,592,474
Carts	5,528,383	$50	$276,419,168
Trucks	1,139	$300,000	$341,740,800
Plastic totes	16,782,712	$8	$134,261,696
Total			**$1,599,014,138**

Note: The units needed have been increased by 11.7% over the values estimated by TRP in 2021 to account for growth in the number of households.

The results associated with this investment are presented in **Table A-7**.

Table A-7. Economic Impacts of Investment in Multifamily Collection

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	6,200	$426	$706	$83
Indirect	5,200	$485	$844	$66
Induced	5,600	$402	$755	$72
Total	**17,000**	**$1,313**	**$2,304**	**$221**

c. New and Upgraded Drop-off Sites

Increasing curbside collection will result in a decline in drop-off recycling for households receiving increased curbside services. However, drop-off sites remain an important method for increasing recycling by providing drop-off sites to households that did not have access previously, and by improving the effectiveness of existing sites. Components of drop-off investment include collection containers, and new trucks (**Table A-8**). This represents $102 million in spending. Seventy-five percent of that is for heavy-duty trucks (commodity 3325). The rest is modeled using the waste management spending pattern for construction and

fixtures, furnishings, and equipment. Major components of this investment spending pattern are presented in this Appendix.

Table A-8. Investment in Drop-Off Sites

Description	Units Needed	Cost per Unit	Total Cost
General Investments			$27,842,000
Trucks	293	$253,003	$74,130,000
Total			**$101,972,000**

Note: These values represent the amount of investment needed to upgrade 746 existing drop-off sites and 746 new sites. RTI did not adjust these values because we do not know what assumptions TRP made about the number of households served by an individual site.

The results associated with this investment are presented in **Table A-9**.

Table A-9. Economic Impacts of Investment in Drop-off Sites

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	180	$18	$28	$2
Indirect	380	$37	$63	$5
Induced	340	$24	$46	$4
Total	**900**	**$80**	**$137**	**$11**

2. New MRFs

Increased collection of recycling materials will require new MRFs to process the increased recycling tonnage. RTI used more recent information about the number of households and volume of recycling materials to estimate that 62 new MRFs would be needed. TRP asserts the per unit construction cost is $17,657,500 (2020) and this estimate covers a range of facility sizes. We used this figure, inflated into 2026 values, to estimate the total economic impact of this construction. We modeled this impact in IMPLAN industry sector 51, construction of other new nonresidential structures. This investment is summarized in **Table A-10**.

Table A-10. New MRFs Needed to Address New Recycling Tonnage

Tons Requiring New MRF Capacity	Number of New MRFs Needed	Average Cost per MRF	Total Estimated Capital
4,509,382	62	$17,657,500	$1,094,765,000

The impact of constructing these facilities is presented in **Table A-11**. These impacts are temporary and would only last for as long as construction occurred.

Table A-11. Economic Impact of New MRFs

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	8,000	$732	$931	$31
Indirect	3,200	$303	$527	$52
Induced	6,200	$448	$842	$80
Total	**17,400**	**$ 1,484**	**$ 2,300**	**$163**

3. Refurbishment of Existing MRF

Increased material capture from expanded recycling access will also require modernizing the infrastructure of existing MRFs to expand or improve sortation, capture rates, and quality. TRP's model includes cost improvements to equipment, conveyor lines and bunker capacity, and installation.

TRP estimated that improvement to existing facilities to operate at 95% efficiency would be $1.5 billion. We used the IMPLAN investment pattern for the waste management industry and customized it to remove trucks. We rebalanced the model without trucks and it determined that 34% of refurbishment funds would be spent on maintenance and repair construction. Fifty types of additional commodities purchased were margined using purchaser margins. A list of major commodities is provided elsewhere in this Appendix. We used IMPLAN's Social Accounting Matrix to determine how much of these commodities were purchased in the United States and how much was imported. A key assumption is that the investment pattern accurately represents what firms would need to purchase to handle more recycling volume versus other needs.

Table A-12 presents the estimate of total economic impacts associated with existing MRF refurbishment.

Table A-12. Economic Impacts of Existing MRF Refurbishment

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	5,600	$535	$791	$46
Indirect	4,000	$381	$658	$60
Induced	5,600	$401	$753	$72
Total	**15,200**	**$1,317**	**$2,202**	**$178**

These impacts are temporary and would only last for as long as construction occurred.

4. Hub-and-Spoke Systems

RTI estimates that 38 new hub-and-spoke systems will be needed to expand recycling collection. Unlike the TRP report, we do not differentiate between major and minor facilities. allocated half of this investment to dumpster (3236) and half to new nonresidential construction (3051). **Table A-13** summarizes this investment.

Table A-13. Investment in Hub-and-Spoke Systems

Description	Total Cost
New nonresidential construction	$29,707,500
Dumpsters	$29,707,500
Total	**$59,415,000**

The impact of constructing these facilities is presented in **Table A-14**. These impacts are temporary and would only last for as long as construction and purchasing occurred.

Table A-14. Economic Impacts of Hub-and-Spoke Investment

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	330	$27	$36	$2
Indirect	190	$17	$30	$3
Induced	270	$19	$37	$4
Total	**790**	**$64**	**$103**	**$8**

6. Education

Educating communities about expanded recycling services is key to increasing material recovery and reducing contamination rates of material. Providing basic education to all households, cart tagging, and proven outreach strategies that increase participation and collected material quality.

Educating households about newly implemented recycling programs was estimated to cost $10 per household for 5 years. As of 2025, there are 134.8 million households in the United States.[3] In current dollars, this equates to $1.59 billion per year for 5 years. This activity is modeled in industry 464, other educational services.

Table A-15 presents the estimate of total economic impacts associated with one year of recycling education.

Table A-15. Recycling Education Impacts for One Year

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	12,200	$642	$854	$69
Indirect	4,000	$365	$630	$39
Induced	6,100	$441	$829	$79
Total	**22,300**	**$1,449**	**$2,313**	**$186**

[3] U.S. Census Bureau. *2025 Current Population Survey Table HH-1. Households by Type: 1940 to present.* hh1.xls

7. Film and Flexible Packaging Collection and Processing

Bandhauer et. Al (2021) presents improvements in plastic film as one of several critically important upgrades for the U.S. recycling system. This investment is estimated to cost approximately $4.5 billion. **Table A-16** details these investments.

Table A-16. Investment in Plastic Film recycling

Description	Total Cost
Household education	$674,301,504
Equipment for MRFs	$931,435,000
Collection bags for households	$2,860,823,840
Total	**$4,466,560,344**

To account for machinery that will be purchased by facilities, we used IMPLAN commodity code 3260, all other industrial machinery manufacturing. We used IMPLAN industry code 464, other educational services, to model educational activities and commodity code 3178, plastic packaging manufacturing to represent the household collection bags. This investment will take place for 4 years.

Table A-17 presents the estimate of annual economic impacts associated with investment in plastic film recycling.

Table A-17. Annual Plastic Film Recycling Equipment Investment Impacts

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	11,500	$519	$647	$87
Indirect	3,600	$316	$565	$40
Induced	5,100	$367	$690	$66
Total	**20,200**	**$1,202**	**$1,902**	**$193**

Operations

As new and expanded MRFs, drop-off centers, and educational activities are completed, the volume of recycled materials will increase. The waste management industry and others will expand as needed to accommodate the increased flow of materials that need to be collected, sorted, and processed.

RTI created a waste flow model to estimate how much recycling volume would increase in each state and nationwide. This model is described previously in this appendix. Based on these estimates, we found that a 30 percentage point increase in the recycling rate associated with a national EPR framework would add 42.5 million metric tons of material that would need to be collected and processed. We then used a 2016 EPA report on the relationship between recycling and job creation, which estimated that 0.00085 jobs are supported for each metric ton of recycled material (EPA, 2016). Applying this factor, we estimated that approximately 36,000 additional jobs would be needed to manage this material.

To estimate the indirect and induced impacts associated with these direct jobs, we input 250 jobs into IMPLAN industry sector 379, Wholesale other durable goods merchants. This increase in direct jobs would also result in indirect and induced jobs and economic activity.

With this estimate of direct employment, we used IMPLAN data year 2024 to estimate indirect and induced impacts. These are provided in **Table A-18**. These impacts will be experienced as long as the infrastructure remains in operation and operating at capacity. This estimate does not include jobs that will be created to turn recycled materials into new products.

Table A-18. Annual Impacts Associated with Higher Rate of Recycling

	Employment	Labor Income ($ millions)	Value Added ($ millions)	State and Local Tax Revenue ($ millions)
Direct	36,200	$3,521	$6,047	$ 469
Indirect	32,800	$2,959	$4,843	$ 373
Induced	39,300	$2,832	$5,322	$ 506
Total	**108,300**	**$9,312**	**$16,211**	**$ 1,348**

Limitations

This methodology may overstate the number of actual jobs associated with greater recycling. The EPA's 2016 research was based on national input-output tables that were produced in 2007, which is a data availability challenge for this sector. Since that time, the methods to collect waste material and tasks such as material sorting have become increasingly automated. As this occurred, the relationships between different industries in the supply chain and the direct amount of labor needed to undertake tasks such as waste collection have changed, yet our data are not updated to reflect this changing labor dynamic. It is likely that this trend will continue as enhanced technology becomes more widespread. This will reduce the number of people needed in the recycling industry and change the composition of the workforce.

Table A-19. IMPLAN Investment Spending Pattern for Waste Management Industry, Commodities that Exceed 0.05% of Spending

IMPLAN Commodity Code	Description	Original % of Total Invest.	Invest % for MRF Upgrade	Invest % for Drop-Off Centers
3325	Heavy-duty trucks	30.0%	0.0%	0.0%
3355	Maintenance and repair construction of nonresidential structures	0.0%	34.2%	0.0%
3254	Construction machinery	20.3%	23.1%	28.9%
3050	Newly constructed commercial structures, including farm structures	10.4%	0.0%	14.8%
3378	Wholesale services – Machinery, equipment, and supplies	9.8%	11.1%	13.9%
3261	Commercial and service industry machinery	4.8%	5.5%	6.8%

IMPLAN Commodity Code	Description	Original % of Total Invest.	Invest % for MRF Upgrade	Invest % for Drop-Off Centers
3450	All other miscellaneous professional, scientific, and technical services	4.2%	4.8%	5.9%
3376	Wholesale services – Professional and commercial equipment and supplies	3.7%	4.2%	5.2%
3324	Automobiles and light duty motor vehicles	2.5%	2.9%	3.6%
3410	Software publishers	2.1%	2.4%	3.0%
3051	Newly constructed nonresidential structures	2.0%	0.0%	2.8%
3379	Wholesale services – Other durable goods merchant wholesalers	1.3%	1.5%	1.9%
3244	Valve and fittings, other than plumbing	1.3%	1.5%	1.9%
3279	Industrial trucks, trailers, and stackers	1.2%	1.4%	1.8%
3441	Custom computer programming services	1.0%	1.1%	1.4%
3388	Retail services – Building material and garden equipment and supplies stores	0.7%	0.8%	1.0%
3047	Newly constructed power and communication structures	0.6%	0.7%	0.8%
3289	Computer terminals and other computer peripheral equipment	0.4%	0.5%	0.6%
3057	Maintained and repaired highways, streets, bridges, and tunnels	0.4%	0.5%	0.6%
3250	Fabricated pipes and pipe fittings	0.3%	0.4%	0.5%

Jobs Associated with EPR-Related Innovation Investment

RTI conducted a survey of food and beverage manufacturers to gather information on anticipated EPR-driven innovation investments. RTI received nine responses, all from large multinational corporations, with annual revenues exceeding $50 million. As a result, estimates reflective of the upper range of potential innovation spending and job creation associated with EPR incentives and should not be interpreted as representative across sectors or company sizes.

Survey data was used in conjunction with Census data on U.S. businesses to derive an estimate of the one-time total national expenditure on packaging innovation responding to incentives of a national EPR policy. These estimates were entered into a customized national IMPLAN I-O model to capture annualized estimates of impact from EPR-driven innovation.

We used IMPLAN, model year 2024, for the United States to conduct this analysis. A single model was constructed encapsulating multiple dimensions of packaging innovation, including packaging manufacturing, chemical science, and material science. Each of these activities will stimulate an increase in demand for goods and services. This spending generates wages for workers in a range of industries and creates revenue, profits, and wages in the sectors that supply goods and services to recycling facilities. The analysis also captures associated employment impacts and increased household spending that result from activity across the

waste management supply chain. Combined, these models estimate the total economic impact of systematic investments in the recycling industry.

IMPLAN models estimate three kinds of results:

- **Direct effects:** These effects represent the economic activity that will occur when the investments documented in this report are undertaken. Examples include laboratory equipment for material science, and labor for materials testing and packaging engineering.
- **Indirect effects:** Also called supply chain effects, indirect effects capture economic activity among businesses that supply goods and services to the food and beverage manufacturing industry, businesses that supply those suppliers, and so forth. These include the industries that supply raw materials used in packaging.
- **Induced effects:** Also referred to as household spending effects, induced effects result from employees whose wages are supported by recycling industry expenditures, directly and indirectly, spending their wages in the local economy on food, transportation, housing, and other living expenses.

Four common measures of economic impact can be used to summarize the national impact of packaging innovation investment. These figures are provided in the main text.

- **Employment:** Consists of all full-time, part-time, and temporary positions. Jobs are reported as an annual average.
- **Labor income:** Represents all forms of employee compensation, including wages and benefits and proprietor income.
- **State GDP:** Provides an indicator of the labor, capital, and tax income generated from production activities. Also referred to as “value-added.” States use GDP to describe the overall size of specific industries and the economy.
- **State and local tax revenues:** Provides an indicator of the value of state and local taxes that will be generated in economies across the country as EPR-driven innovation occurs.

In addition to these measures shown in the main text additional figures are shown below:

- **Wage & salary income:** Includes base salary and/or wages, employee paid social insurance tax, bonuses, stock options, severance pay, profit distributions, and reimbursements for meals and lodging.
- **Supplements to wages and salaries:** Consists of employer contributions for pension/insurance funds and government social insurance (e.g., payroll taxes).
- **Total employee compensation**: Includes wages and supplements. This represents the fully loaded cost of employment to a company.

RTI used the following assumptions in the analysis:

- From the survey, respondents estimated a range of $1.5 million to $5 million in annual packaging innovation investment. Respondents also provided estimates that packaging innovation investment for their company would continue for at least 3 years. As a conservative assumption, RTI modelled only the effects of one year of increased packaging innovation.
- The U.S. Census business statistics were used for estimating total packaging innovation expenditure (Census Bureau, 2025). The industries used to represent the food and beverage industries consisted of the NAICS industries for beverage and tobacco product

manufacturing (312), chemical manufacturing (325), food manufacturing (311), and other miscellaneous manufacturing (3399).

- From Census business statistics, revenue by business employment was obtained. Due to EPR exceptions for businesses with low annual revenues, businesses below $1 million in revenue were excluded for deriving estimates of total innovation expenditure.
- To remain conservative in estimation, it was assumed that the $1.5 million to $5 million investment figures represented the investment of the highest bin of companies, corresponding to the Census data—those with over 500 employees. These companies average $900 million in total annual revenues, resulting in the median estimate that 0.4% of an average food and beverage company's revenue is invested in packaging innovation.

Tables A-20 and **A-21** present additional data regarding the employment outcomes from one-time investment in packaging innovation in the food and beverage industry.

Table A-20 presents the top industries by employment resulting from the one-time packaging innovation investment. From the performance of a custom industry outcome event in IMPLAN, all direct employment is experienced in a combined industry for packaging innovation. This industry encapsulates both food and beverage manufacturing industries, as well as packaging R&D and material science industries.

Table A-20. Employment by Industry Resulting from One Year of Packaging Innovation Investment in the Food and Beverage Industry

Industry	Direct Employment	Indirect Employment	Induced Employment	Total Employment
Packaging Innovation	23,820	2,160	160	26,140
Real estate	0	4,140	1,050	5,190
Employment services	0	1,940	620	2,560
Management consulting services	0	1,740	200	1,940
Full-service restaurants	0	370	1,320	1,690
Legal services	0	1,360	290	1,650
Limited-service restaurants	0	140	1,320	1,460
Hospitals	0	0	1,350	1,350
All other food and drinking places	0	450	690	1,140
Management of companies and enterprises	0	660	460	1,110

Other employment impacts are experienced through indirect and induced employment. Indirect employment is the industries that experienced higher employment from the provision of intermediate goods and services to packaging innovation industries. In this case, the highest indirect employment accrues to real estate, employment, consulting, and legal firms. Induced employment comes from industries that are supported by consumer spending from employees in the directly affected industries. In this case, the highest induced employment accrues to restaurants, health care, and real estate firms.

Table A-21 shows the occupations that receive the greatest employment and compensation from the one-time packaging innovation expenditure. The occupations in **Table A-21** span the industries that received direct, indirect, and induced impacts from packaging expenditure.

Table A-21. Employment and Wages by Occupation Resulting from one year of Packaging Innovation Investment in the Food and Beverage Industry

Occupation	Employment	Wage and Salary Income ($ millions)	Supplements to Wages and Salaries	Total Employee Compensation ($ millions)
Business Operations Specialists	4,170	$492	$79	$571
Computer Occupations	3,510	$532	$83	$614
Management Occupations	2,440	$467	$74	$541
Engineers	2,270	$333	$52	$385
Life Scientists	2,180	$273	$42	$315
Top Executives	1,940	$399	$65	$463
Operations Specialties Managers	1,580	$347	$56	$402
Material Moving Workers	1,840	$87	$16	$103
Medical Practitioners	1,570	$219	$42	$261
Financial Specialists	1,340	$183	$29	$212

Many of the occupations shown within **Table A-21** come from supportive business functions in the direct packaging innovation industry or in industries affected indirectly, including business operations, computer occupations, executives, operations specialties and financial specialists. Others more directly pertain to R&D functions, such as engineers, life scientists, and material moving works. Finally, due to the large number of induced benefits, medical practitioners also experience high employment and compensation benefits due to downstream household spending at hospitals or medical facilities.

Producer Efficiencies from Harmonized EPR Rules

The analysis compares two scenarios: (1) a national framework providing harmonized national rules for EPR, in which producers comply through a single consistent national set of rules, and (2) a scenario wherein states each develop and enforce different rules, leading to a fragmented set of EPR rules (specifically, 10 distinct EPR frameworks would apply across the 50 states, each with its own requirements). The analysis focuses on producers in multiple sectors, including food and beverage, retail, household goods, and personal care sectors with nationwide sales and draws on RTI interviews and surveys with industry representatives. The analysis captures several forms of EPR policy that add administrative costs beyond basic registration, data collection, reporting, and PRO fees. These costs arise when producers must interpret and comply with different requirements across jurisdictions, product categories, and PROs. For companies selling multiple products nationwide, the burden compounds as similar tasks are repeated and data, documentation, and payment processes are adapted to each framework.

- **Method of registering with a PRO or official register:** Divergent EPR frameworks may have different forms required for registration with their PRO, and PROs may each have their own registration process. A unified EPR policy may have a single PRO registration process with equivalent forms and a centralized web portal.
- **Registration requirements:** EPR frameworks may define the obligated producer differently, apply different thresholds, and request different information at registration. Although basic business information is often similar, frameworks may diverge on product scope, brands, selling technique, authorized representative requirements, signatures, tax identification numbers, financial guarantees, and historical or forecast data. Collectively, these requirements create added compliance costs when producers must determine whether they are in scope, gather jurisdiction-specific documentation, and repeat the process for each product stream and market.
- **Reporting requirements:** Producers may need to collect and transform product, packaging, or material data into different formats depending on the EPR framework aligned to different definitions, requiring producers under multiple frameworks to more complex internal data systems or manually rework data for each framework. Differences in frameworks include the following:
  - *Reporting frequency, deadlines, and method:* Some frameworks require annual reports, while others require quarterly or monthly submissions based on product type, fee level, or volume placed on the market. Varying deadlines require producers to track multiple compliance calendars and potentially use dedicated personnel, consultants, or tracking tools.
  - *Product categories and terminology:* Product categories may differ even for similar materials or products. One framework may require broad material reporting, while another may require more granular distinctions by product form, use, composition, recyclability, or end-of-life pathway. This requires producers to map the same product data into different classification systems.
  - *Thresholds and exemptions:* Simplified reporting thresholds and exemptions vary across frameworks. A producer may qualify for simplified reporting in one jurisdiction but not another, or may be exempt from some reporting requirements while still needing to register. Thresholds may be based on weight, units, material type, fees paid, turnover, or other criteria, requiring producers to monitor multiple eligibility rules.

Payment processes and fee calculations: PROs rely on different criteria for calculating EPR fees. Payment schedules may be annual, quarterly, monthly, or include reconciliation invoices. These differences increase administrative costs because producers must forecast volumes, manage cash flow, track multiple invoices, reconcile payments, and monitor eco-modulation criteria that may vary across markets.

To estimate these costs, RTI surveyed producers about their current and expected spending on EPR compliance activities, including the marginal cost of complying with one additional state regime that is only *somewhat* different from existing dominant EPR models (i.e., slight differentiation on definitions but similar goals). This isolated the added burden created by policy inconsistency across states. The analysis focuses on administrative costs that increase directly with the number of frameworks, including regulatory interpretation, packaging data collection and formatting, PRO registration and reporting, and related staff, consultant, and capital support. It does not include costs that are not primarily driven by administrative fragmentation, such as EPR fees or broader packaging innovation investments.

RTI's producer survey received nine responses, all from large multinational corporations with estimated annual revenues exceeding $50 million. Accordingly, the reported costs are reflect the compliance investment capacity of larger corporations and should not be interpreted as representative of costs across all sectors or company sizes.

In calculating the estimates of costs for EPR compliance, RTI made several underlying assumptions in the calculation of final EPR cost estimates. These assumptions include:

- Producers provided estimates of the Full-Time Employee (FTE) expenditure during the reporting period for a single EPR policy period. An EPR reporting period was assumed to be one quarter of a year.
- Producers provided estimates of the FTE expenditure among the following components of EPR compliance:
  - Understanding new state law or regulations,
  - Comparing new and existing requirements,
  - Determining whether packaging materials are covered,
  - Mapping state-specific reporting definitions,
  - Collecting or reformatting packaging data,
  - Coordinating with internal business units, brands, or product teams,
  - Coordinating with suppliers or packaging vendors,
  - Preparing registration or PRO materials,
  - Preparing reporting submissions,
  - Reviewing fee schedules or eco-modulation requirements,
  - Legal review,
  - Software, systems, or data management changes, and
  - Internal training or process updates.
- Producer fees under EPR policies and innovation costs were assumed to be constant between the harmonized and fragmented EPR policy scenarios.
- Producers provided FTE costs disaggregated by occupation. RTI utilized median public estimates of salaries for stated occupations to convert time expenditure into estimates of administrative costs incurred by companies.

Key Equations:

$$\textbf{Harmonization Savings}_i = \text{Producer costs}_{\text{state-level}} - \text{Producer costs}_{\text{harmonized}}$$

$$\textbf{Producer costs}_i = \text{Direct Payments to PROs}_i(\text{Eco-modulation policy}_s) + \text{Administrative costs}_i + \text{Innovation costs}_i$$

$$\textbf{Administrative costs}_i = \sum\text{Understanding obligations}_{i(s+n)}(\text{Joining registries}_s, \text{Registration thresholds, Signature requirements}_s, \text{Product categories}_s) + \sum\text{Registration with PROs}_{(s+n)} + \sum\text{Reporting}_{i(s+n)}(\text{Reporting categories}_s, \text{Reporting frequency}_s, \text{Historical data/forecasting}_{is}, \text{Data collection}_{is}, \text{Reporting method}_s)$$

$$\textbf{Innovation costs}_i = \text{R\&D costs}_i + \text{Implementation costs}_i$$

i = year s = reporting area(state); n = number of reporting areas

Impacts on Labor Markets from National EPR Framework Implementation

This analysis estimates the workforce impacts of increased recycling activity under a national EPR framework by linking projected changes in waste flows to corresponding labor demand across the recycling system. Using assumptions on facility retrofits, new construction, and operational expansion, the analysis quantifies increases in MRF capacity and associated activities (e.g., collection, processing, and wholesale distribution). These activity levels are then translated into employment demand using Bureau of Labor Statistics (BLS) industry–occupation crosswalks, supplemented with information on supply chain linkages to capture both direct and supporting roles.

To estimate the scale and composition of workforce impacts, occupation-level employment and wage data from the BLS Occupational Employment and Wage Statistics program are combined with skill and training requirements from O*NET. A five-state sample is used to develop per capita estimates of job creation, which are then scaled to the national level. Jobs are categorized into broader groups (e.g., lower-skill/lower-wage and higher-skill/higher-wage positions), and the analysis assesses wage distributions and implications for workforce development, including potential needs for expanded training pipelines in technical and operational roles.

Recycling education is assumed to be focused in the initial 5 years of EPR implementation, alongside other near-term roles tied to construction, equipment provision, material sorting, collection, and storage. However, additional community education may be needed beyond the initial implementation window, which would increase ongoing demand for recycling educators and program support staff.

Input-output models are based on Bureau of Economic Analysis data collected every 5 years, with the most recent data from 2022. As a result, the model reflects historical industry relationships and may not fully capture how automation, robotics, and AI could reshape future recycling jobs.

Automation is likely to reduce demand for some manual and high-risk roles, including waste collection, manual sorting, and frontline picking, as robotic systems and AI-enabled sorters take on hazardous, repetitive, and physically demanding tasks. At the same time, these technologies may increase demand for workers who can operate, maintain, and repair advanced equipment; manage data-driven collection systems; and coordinate more automated logistics and processing operations. Thus, future employment impacts may shift from manual labor toward higher-skill technical, maintenance, and system management roles.

Table A-22. Estimated Job Creation by Occupation for Nationwide EPR Adoption

Occupation	Percent of New Jobs	Potential Job Creation	Median Pay (2024)	Typical Entry level Education and Experience	Estimated Change in Employment 2024–2034
Refuse and Recyclable Material Collectors	21	5,736	$48,350	High school diploma or equivalent, Short-term OJT (On job training)	4%

Occupation	Percent of New Jobs	Potential Job Creation	Median Pay (2024)	Typical Entry level Education and Experience	Estimated Change in Employment 2024–2034
Driver/Sales Workers and Truck Drivers	19	5,126	$42,770	High school diploma or equivalent, Short-term OJT	8%
Laborers and Material Movers	9	2,334	$37,680	No formal credential	4%
General and Operations Managers	5	1,383	$102,950	Bachelor's degree, 5 + years of experience	4%
Bus and Truck Mechanics and Diesel Engine Specialists	3	821	$60,640	High school diploma, Long-term OTJ	3%
First-Line Supervisors of Transportation and Material Moving Workers	3	781	$61,890	High school diploma	3%
Miscellaneous Sales Representatives, Services*	2	650	$69,990	High school diploma	3%
Secretaries and Administrative Assistants	2	520	$47,460	High school diploma, Moderate-term OTJ	0%
Customer Service Representatives	2	490	$42,830	High school diploma or equivalent, Short-term OJT	-5%
Maintenance and Repair Workers, General	2	424	$48,620	High school diploma, Moderate-term OTJ	4%
Logisticians and Project Management Specialists	1	376	$80,880	Bachelor's degree	17%
Bookkeeping, Accounting, and Auditing Clerks	1	352	$49,210	Some college, no degree, Moderate-term OTJ	-6%
First-Line Supervisors of Office and Administrative Support Workers	1	301	$66,140	Vocational training, Moderate OJT	0%
Building Cleaning Workers	1	276	$35,930	No credential, Short OJT	2%

Occupation	Percent of New Jobs	Potential Job Creation	Median Pay (2024)	Typical Entry level Education and Experience	Estimated Change in Employment 2024–2034
Dispatchers*	1	273	$50,340	High school diploma, Short OTJ	-1%
Inspectors, Testers, Sorters, Samplers, and Weighers	1	211	$47,460	High School diploma, Moderate OJT	0%
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	1	199	$45,650	High School diploma, Moderate OJT	-1%
Industrial Truck and Tractor Operators	1	188	$46,390	High School diploma, Moderate OJT	1%

* Wage, education, and outlook information provided for similar occupation 31-3091. Sales representative of services and 43-5032, dispatchers, except police, fire, and ambulance.

Source: Wages, education, and job outlook data come from the Bureau of Labor Statistics Occupational Outlook Handbook. For occupations that were not found in this source, data from the U.S. Department of Labor O*NET database were used.

State-Level Case Studies of National EPR Economic Impact

Input-output analysis is a well-known and reliable methodology for estimating the total impacts associated with new investment, policy changes, and other events. The framework and methodological basis for the IMPLAN model is derived from the U.S. Department of Commerce's Benchmark Input-Output (I-O) Accounts. The I-O accounts provide detailed information on the flows of the goods and services that make up the production processes of industries. The benchmark tables depict how spending in one industry affects others. These relationships determine how regional economies may respond to specific economic events.

Specifically, we used IMPLAN, model year 2024 for individual states to conduct this analysis. A single model was constructed for each state with events consisting of expanding recycling collection, construction of new MRFs, renovation of existing MRFs, additional spoke-and-hub systems, household education about recycling, and new equipment and investments that will allow MRFs to recycle plastic films. Each of these activities will stimulate an increase in demand for goods and services. This spending generates wages for workers in a range of industries and creates revenue, profits, and wages in the sectors that supply goods and services to recycling facilities. The analysis also captures associated employment impacts and increased household spending that result from activity across the waste management supply chain. Combined, these models estimate the total economic impact of systematic investments in the recycling industry.

IMPLAN models estimate three kinds of results:

- **Direct effects:** These effects represent the economic activity that will occur when the investments documented in this report are undertaken. Examples include capital expenditures on facilities, recycling carts, education, and equipment.
- **Indirect effects:** Also called supply chain effects, indirect effects capture economic activity among businesses that supply goods and services to the recycling industry, businesses that supply those suppliers, and so forth.

- **Induced effects:** Also referred to as household spending effects, induced effects result from employees whose wages are supported by recycling industry expenditures, directly and indirectly, spending their wages in the local economy on food, transportation, housing, and other living expenses.

Four common measures of economic impact can be used to summarize the national impact of expanding recycling infrastructure:

- **Employment:** Consists of all full-time, part-time, and temporary positions. Jobs are reported as an annual average.
- **Labor income:** Represents all forms of employee compensation, including wages and benefits and proprietor income.
- **State GDP:** Provides an indicator of the labor, capital, and tax income generated from production activities. Also referred to as "value-added." States use GDP to describe the overall size of specific industries and the economy.
- **State and Local Tax Revenues:** Provides an indicator of the value of state and local taxes that will be generated in economies across the country as recycling infrastructure is placed in service.

Appendix B: Information About IMPLAN

IMPLAN is a regional economic analysis software application that is designed to estimate the impact or ripple effect (specifically backward linkages) of a given economic activity within a specific geographic area through the implementation of its Input-Output and Social Accounting Matrix model. Studies, results, and reports that rely on IMPLAN data or applications are limited by the researcher's assumptions concerning the subject or event being modeled. Studies such as this one are in no way endorsed or verified by IMPLAN Group LLC unless otherwise stated by a representative of IMPLAN.

IMPLAN provides the estimated indirect and induced effects of the given economic activity as defined by the user's inputs. Some direct effects may be estimated by IMPLAN when such information is not specified by the user. While IMPLAN is an excellent tool for its designed purposes, it is the responsibility of analysts using IMPLAN to be sure inputs are defined appropriately and to be aware of the following assumptions within any Input-Output and Social Accounting Matrix Model:

- Constant returns to scale
- No supply constraints
- Fixed input structure
- Industry technology assumption
- Constant byproducts coefficients
- The model is static
- Backward linked
- Time delineated

IMPLAN® model, 2020 Data and 2024 Model, using inputs provided by The Recycling Partnership, RTI International, and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 www.IMPLAN.com