

The Real-World Household Costs of California's SB 54 Packaging Regulations

June 2026

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Executive Summary

California's Senate Bill 54 (SB 54), the Plastic Pollution Prevention and Packaging Producer Responsibility Act, requires producers of plastic packaging and food service ware to fund and achieve sharp reductions in plastic packaging, high recycling rates, and a shift toward reusable and recyclable materials. As part of the regulatory process, the California Department of Resources Recycling and Recovery (CalRecycle) prepared a Standardized Regulatory Impact Assessment (SRIA) in June 2025. The SRIA shows total implementation costs of about \$21.0 billion from 2022-23 through 2031-32 and an average annual cost per household of \$190. These costs included environmental surcharges, reporting and administrative expenses, and costs to businesses for implementing major program goals. The latter included costs for establishing and operating reuse and refill systems for containers, switching from single-use plastic to recyclable alternatives, and infrastructure expenses for accommodating the added volume of recycled materials.

This report evaluates the cost estimates in the SRIA, both in total dollars over the implementation period (now 2026-27 through 2031-32) and in average-annual costs per household in California. Our main conclusions are:

- The SRIA's estimates rest on idealized assumptions that fail to capture the real-world costs and complications the regulations will create.
 - This is evidenced by subsequent Needs Assessment studies produced by CalRecycle's own contractors, which showed source-reduction and infrastructure costs to be two to three times higher than estimated in the SRIA.
 - However, even these Needs Assessment reports rest on optimistic assumptions regarding such factors as return rates and cost of implementing a consumer return system meeting the exacting standards of the regulations.
- Based on these and related factors, we estimate total costs over the implementation period will be between \$56 billion and \$78 billion, translating into average **annual costs of \$683 to \$948 per-household** during the implementation period.
- Equally important, we find that costs will rise sharply through the implementation period, with annual per household costs ranging from \$950 to \$1,350 by 2031-32. The majority of these costs continue indefinitely into the future under the regulations.

The initial California Extended Producer Responsibility (EPR) Program Plan submitted to the Producer Responsibility Advisory Board on June 15, 2026 is an acknowledgement that the SB 54 regulations are very costly and simply not feasible. The plan spends billions, shifts most costs for material switching and source

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reduction to producers, and relies on exemptions for virtually every major covered material, especially plastics.

The bottom line is that the SB 54 regulations will sharply raise costs to Californians at a time when they are already struggling with high costs for food, housing, energy, and a host of other items. The increases will act like a regressive tax, sharply constraining budgets of lower- and moderate-income households that will face price increases for a wide variety of packaged goods they consume each year.

Background

SB 54 requires that, by 2032, all single-use packaging and plastic food service ware sold in California be recyclable or compostable; that the amount of plastic covered packaging be reduced by 25 percent (with at least 10 percent of that reduction achieved through shifting to reuse or refill systems or eliminating components); and that plastic packaging achieve a 65 percent recycling rate. Producers – generally the brand owners and manufacturers – will bear the costs, organized through a Producer Responsibility Organization (PRO), a nonprofit that will register producers, collect fees, and fund the recycling system on their behalf. As part of the rulemaking process, CalRecycle was required to produce two sets of documents that address the costs of regulations implementing SB 54. The first is the Standardized Regulatory Impact Assessment (SRIA),¹ which California law requires before major regulations take effect. **Figure 1** summarizes the SRIA's cost estimates of implementing the SB 54 regulations over the implementation period of 2022-23 through 2031-32.

Figure 1
SRIA Estimate of the Implementing Costs of SB 54 Regulations
(Total \$ in Millions; Household \$ are Actual)

Cost Centers	Total 2022-23 through 2031-32	Annual/ Household
Surcharges and Administrative Costs:		
• PRO Costs	\$117	\$1
• Environmental Surcharge	\$2,500	\$23
• Circular Economy Fund	\$77	\$1
• Producer Reporting	\$117	\$1
• Other	\$24	\$0
Major Goals:		
• 25% Source Reduction	\$5,370	\$49
• Recycling Rate Increase – Switching Costs	\$10,200	\$92
• Recycling Infrastructure	\$2,607	\$24

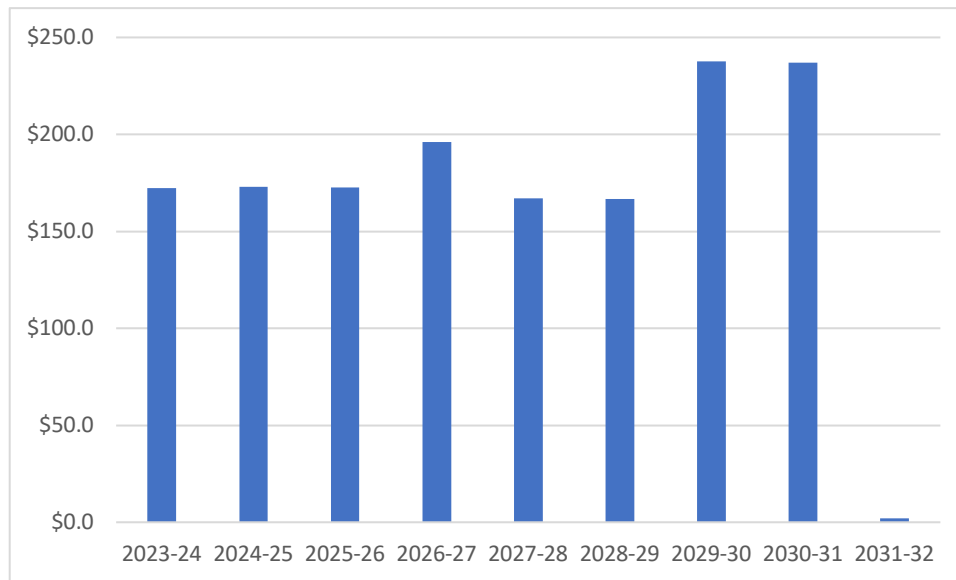
¹ See Department of Finance, [Proposed Regulations for the Plastic Pollution Prevention and Packaging Producer Responsibility Act](#).

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Grand Total	\$21,012	\$190
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It shows total costs of \$21 billion and per household annual costs over the period of \$190. The SRIA presents these costs as temporary, with most of them going away once California transitions over to the new recycling and reuse regime. This is misleading given that the environmental surcharge continues for several more years; moreover, the one-time characterization fails to recognize that a large portion of the added costs are for ongoing operations associated with the expanded reuse, more expensive alternative packaging, and expanded recycling operations. As indicated in **Figure 2**, the SRIA estimates annual costs to peak in 2030-31 then drop almost to zero in 2031-32.

Figure 2
CalRecycle SRIA Estimate of Annual Per-Household Cost of SB 54 Regulations



The second set of documents are Needs Assessment reports – detailed technical studies that CalRecycle commissioned from contracting consultants to determine, from the “ground up,” what the state would actually need to build and spend to meet the law's targets. So far, CalRecycle has released two substantive Needs Assessment reports: a source reduction Needs Assessment², prepared by the consultancy Eunomia; and a collection, processing, and end markets Needs Assessment, prepared by HF&H Consultants.³ Both were published in February 2026, eight months after the release of the June 2025 SRIA. So far, CalRecycle has not updated its SRIA to reflect the findings of these Needs Assessments, which, as discussed below, found costs for

² CalRecycle. [An Analysis of Actions and Investments Needed to Achieve Source Reduction Report](#), and [An Analysis of Actions and Investments Needed to Achieve Source Reduction Appendices A-H](#)

³ CalRecycle. [The Needed State of Collection, Processing, and End Markets Report](#) and [The Needed State of Collection, Processing, and End Markets Appendices A-D](#)

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source reduction and recycling infrastructure that were up to three times the costs identified in the SRIA.

Where the SRIA and the later Needs Assessments disagree, the difference is not between CalRecycle and an outside critic – it is between CalRecycle's official cost estimate and CalRecycle's own subsequently commissioned technical work.

A recurring theme runs throughout the comparison: the SRIA's estimates reflect idealized assumptions – easily switched packaging choices, high return and recovery rates, frictionless markets, one-time rather than ongoing costs, and well-developed end markets – while the Needs Assessments, looking facility by facility and material by material, find a more complicated and much more expensive reality.

In addition, the proposed regulatory text itself has continued to evolve since the SRIA was published, and so far, the SRIA has not been updated to reflect the cost implications of these changes. For example, January 2026 revisions to the regulations sharply narrowed the packaging exemptions for food, which, as discussed in our section on Switching Costs below, has major spoilage-related cost implications.

We would note that, while the Needs Assessments captured many of the real-world costs that will occur under the regulations, they did not capture all of them, and in some places their estimates rest on optimistic assumptions. Also, the needs assessments issued so far cover two of the three major cost drivers under SB 54 – source reduction and collections, processing and end markets (which are collectively referred to as “recycling infrastructure,” or just “infrastructure” throughout this report). They do not include producer costs associated with switching away from single-use plastic packaging, which is the largest cost-driver in the regulation. Our estimates discussed below cover both the findings of the Needs Assessments plus additional adjustments we made, primarily for (1) areas where we believe the Needs Assessments assumptions were optimistic and (2) serious errors and omissions in CalRecycle's estimates of switching costs.

Our Estimates

Starting with the SRIA estimate, **Figure 3** (next page) summarizes the incremental adjustments we made to the CalRecycle estimates in each major cost center. We show our results in terms of total costs over the revised implementation period from 2026-27 through 2031-32, as well as average annual household costs associated with these adjustments.⁴

Based on findings of the CalRecycle-commissioned Needs Assessments and our additional adjustments, we estimate that actual costs over the implementation period will exceed the SRIA estimate by between \$35 billion and \$58 billion, leading to total costs of between \$56 billion and \$78 billion dollars. The comparable average annual

⁴ Costs fall in the first instance on producers, but producers pass them through to the businesses that buy packaged goods and ultimately to consumers; the SRIA assumes full pass-through to households, and we retain that assumption for comparability.

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per household cost is between \$493 and \$758 higher, resulting in a revised average cost range of from \$683 to \$948 per household.

Figure 3
CMC Adjustments to SRIA Cost Estimates
(Total \$ in Millions; Household \$ are Actual)

	Conservative Alternative		Full Policy Implementation	
	Total 2026-27 thru 2031-32	Annual/ Household	Total 2026-27 thru 2031-32	Annual/ Household
SRIA Estimate:				
• As published ^{\a}	\$21,012	\$190	\$21,012	\$190
• Delayed start	\$21,012	\$254	\$21,012	\$254
Incremental Cost increases:				
• Source reduction	\$7,028	\$85	\$25,544	\$309
• Pkg switching	\$23,435	\$283	\$23,397	\$283
• Infrastructure	\$4,965	\$60	\$8,395	\$101
• Reporting	\$130	\$2	\$130	\$2
Total Increases	\$35,558	\$493	\$57,466	\$758
Revised Estimate	\$56,570	\$683	\$78,478	\$948

^{\a} As published, SRIA assumed Implementation window of 2022-23 through 2031-32.

In the following subsections, we discuss each adjustment in more detail.

Timing Adjustment

The SRIA spreads its \$21.0 billion in costs across an implementation period that largely begins in 2023-24. In practice, the regulations' effective start has slipped – the current regulatory text dates from May 2026 – so the same costs are now compressed into a shorter window of the six fiscal years from 2026-27 through 2031-32. Spreading the same total over fewer years raises the average annual cost per household from the SRIA's stated \$190 to \$254 before any change to the underlying cost estimates are made. This adjustment reflects timing alone, not any new cost, and it is the reason our build-up of per household costs begins at \$254 rather than the \$190 that appears in the SRIA.

Source Reduction

Source reduction means using less plastic packaging in the first place – by redesigning or eliminating packaging, using less material, switching to non-plastic materials, or moving to reusable and refillable systems. SB 54 requires a 25 percent reduction in plastic covered packaging, with at least 10 percent of that achieved through reuse, refill, or elimination.

The SRIA estimates source reduction will cost about \$5.4 billion (see **Figure 4**, next page). However, CalRecycle's own source reduction Needs Assessment estimates that source reduction costs will be 1.5 to 2.9 times higher. Specifically, the Needs Assessment models two pathways: Pathway A, which is weighted toward material substitution, is estimated to cost \$8.2 billion (or \$2.8 billion more than the SRIA); and Pathway B, which is weighted toward reuse and refill, is estimated to cost \$15.4 billion (\$10 billion more than the SRIA).

Figure 4
Costs for Source Reduction
(Total \$ in Billions; Household \$ are Actual)

	Pathway A		Pathway B	
	Total 2026-27 thru 2031-32	Annual/ Household	Total 2026-27 thru 2031-32	Annual/ Household
SRIA	\$5,400	\$65.23	\$5,400	\$65.23
Needs Assessment:				
• Increase	\$2,800	\$33.82	\$10,000	\$120.80
• Total	\$8,200	\$99.06	\$15,400	\$186.03
Further CMC Increases	\$4,230	\$51.10	\$15,544	\$187.77
Grand Total	\$12,430	\$150.15	\$30,944	\$373.80

Factors behind the Needs Assessment's higher cost estimate. The CalRecycle SRIA estimate of costs associated with the 10 percent increase in reuse is based on a study that examined what a reuse program could achieve if implemented nationwide in France. However, the French study was based on idealized conditions, including the use of common packaging, high customer return rates, low damage rates, optimized distribution of return centers and filling sites, with no adjustments for real-world constraints specific to California, such as population distributions and land-use restrictions.⁵ The study was also based on labor costs in France, which are one-third lower than in California.⁶ The

⁵ For example, the French study contained the following disclaimer: "Our transport modelling does not represent any specific, existing supply chain, nor the exact locations of existing facilities; instead, the locations of existing distribution centers and filling sites needed to be estimated using population density hotspots. This means that the estimated locations of sites are likely optimized. Given existing infrastructure and location constraints for certain facilities or certain products (e.g., mineral water filling next to source), real world systems may not fully achieve the optimization of transport distances as modelled. See ['Unlocking a Reuse Revolution: Scaling Returnable Packaging.'](#)" Ellen MacArthur Foundation.

⁶ Sources: According to the OECD, the average wage in France during 2023 (most recent year reported) was \$59,087 (<https://www.oecd.org/en/data/indicators/average-annual-wages.html>). According to the Quarterly Census of

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per-cycle system cost derived from the France study was then applied to 6.1 billion single-use packages. This methodology aggregates the entire reuse system into a single per-package cost number and does not separately price the discrete infrastructure components – washing, sorting, returns, transport, packing/filling, R&D, outreach, and program administration – that the source reduction Needs Assessment quantifies stage-by-stage.

More specifically, the Needs Assessment focused on costs in ten key areas, looking at what will be needed, what currently exists, and the resulting gap. These areas included outreach, research and development, manufacturing, forward transport, packing/filling, returns, sorting, washing, and reverse transport. The Needs Assessment also modeled other source reduction strategies through four cost centers: packaging redesign, tooling and equipment, marketing and commercial, and material/feedstock. In doing so, the Needs Assessment identified billions of dollars in additional costs that were either minimized or ignored by the SRIA.

Additional Costs Beyond the Needs Assessment Totals

The Needs Assessment captures the real-world cost of reuse far more accurately than the SRIA. However, our review indicates that even this analysis rests on optimistic assumptions. As indicated in Figure 4 (above), we estimate that actual costs will exceed the Needs Assessment Estimate by between \$4.2 billion and \$15.5 billion over the implementation period, due to the following factors:

Return rates likely overstated. The Needs Assessment reuse cost model assumes very high return rates for reusable packaging – 88 percent for closed-loop food service ware, and 95 to 98 percent for business-to-business packaging. The cost of a reuse system is sensitive to this assumption because every container that is not returned must be replaced. Each ten-percentage-point shortfall in the return rate (from 88 to 78 percent) adds on the order of \$3 billion to Pathway B's source reduction cost.

The closest California analogy is the Petaluma Reusable Cup Project, a 2024 pilot program in which roughly thirty restaurants and convenience stores (including varied major brands ranging from McDonalds to Starbucks) in the City of Petaluma used reusable cups for three months. Consumers returned about 51 percent of the cups distributed – well below the Needs Assessment's 88 percent assumption for the same category. The project was a deliberately favorable test: cups were provided at no extra cost to consumers, and more than 60 return bins were placed across the city so cups could be dropped off at any location in town. This bin placement is 13 times denser than the minimum SB 54 requirement. That a well-resourced, city-wide, frictionless system delivered only a 51 percent return rate is a meaningful data point on what California should expect at scale.

Higher rates have been achieved in narrower settings – institutional dining halls with meaningful financial penalties for non-return have reached the return rates in mid-80-percent range, and Germany's mature refillable beer bottle system, with mandatory deposits and decades of consumer habituation, runs at about 84 percent – but these conditions are not present in California today. Even under the best of circumstances,

Employment and Wages, the average wage in California during the same year was \$87,490. (<https://labormarketinfo.edd.ca.gov/qcew/qcew-select.asp>).

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it would take years, if not decades, for California to approach the rates experienced in Germany. (The much higher return rates often cited from European deposit-return schemes, in the 90s, are for single-use containers collected for recycling, not refillable containers collected for reuse, and are not the right comparator.) Among the three Needs Assessment assumptions, only the 98 percent rate for industrial business-to-business tote boxes is well supported by experience, and that category covers only a small fraction of the reuse SB 54 contemplates.

For our estimates, we assume an overall return rate of 70 percent during the implementation period, which results in additional costs of between \$1.2 billion and \$5.5 billion over the implementation period. In our view, this rate, which is roughly halfway between the Petaluma experience and the peak rates experienced in Germany and observed in narrow settings, still has significant downside risk.

Consumer return requirements will raise costs sharply. While the Needs Assessment does a much better job than the SRIA in identifying costs associated with a reuse/refill system, even this study does not appear to fully incorporate the cost of the highly prescriptive consumer return requirements included in the SB 54 regulations. For a package to count as reusable or refillable – and therefore to count toward the source reduction and reuse requirements under the regulation – the producer must provide a way to return or refill reusable wares that meet exacting customer convenience standards. A return point must be either the place the item was obtained or a location within one mile of it, and that return point must stay open at least the same hours as the place of purchase.

The practical implications of these requirements are striking. A beverage sold in reusable packaging at a twenty-four-hour convenience store must have a return option available twenty-four hours a day; a meal delivered at midnight must allow for return of packaging at midnight. For items ordered online and delivered to the door, the producer must allow return by the same means – in effect, arranging pickup from the consumer's home, which costs far more per item than the centralized collection the Needs Assessment modeled.

Two further features increase return costs to businesses. First, the one-mile rule is easy to satisfy amid dense urban retail, but in rural and lower-density parts of California it requires dedicated return points – lockers, partner sites, or postal arrangements – that do not otherwise exist. Second, the regulations find a producer to be in violation whenever it sells an item it claims to be reusable or refillable in any location that fails to meet these standards. To avoid that exposure, a producer must continuously track, location by location across the state, whether a compliant return or refill option exists, what hours it keeps, and how far it sits from the point of sale.

The Needs Assessment modeled a centralized network of washing and sorting hubs serving roughly 96,000 to 106,000 food service and supermarket locations; it did not appear to price in extended or overnight return hours or other elements the producer-liability rule requires. The requirement itself reaches well beyond the food service settings the contractor modeled; it also covers big-box, drugstore, convenience, and specialty retail locations – wherever a producer wishes to claim reusability.

Because these costs depend on choices producers have not yet made and on conditions that vary across thousands of locations, it is difficult to pinpoint precise

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costs of these additional requirements. However, we estimate that a reasonable range would be \$3 billion to \$10 billion over the implementation period. The low end assumes producers comply narrowly – partnering heavily with existing retail networks to absorb returns at low marginal cost, accepting some non-compliance in hard-to-reach geographies, limiting which products they claim as reusable to avoid the obligation altogether, and building lean compliance systems. The high end assumes a fuller build-out – meaningful extended-hours staffing, broad home-pickup networks for e-commerce, the dedicated rural return infrastructure the one-mile rule implies, and robust location-level compliance tracking.

Pathway A costs may be understated. The lower cost estimate for Pathway A, which focuses on product substitution, may be partly offset by higher costs for package switching, collection, processing, and end-markets (discussed below). The estimates in these areas appear to be scoped principally around plastic. It is not clear whether the additional paper, glass, metal, and compostable capacity that a substitution-heavy compliance approach would require is fully accounted for in the Needs Assessment modeling. We cannot quantify these channels from the published Needs Assessment and have made no adjustments to our estimates to reflect these costs. However, there is a risk that the full cost of Pathway A is meaningfully closer to the reuse-emphasis Pathway B than Figure 4 suggests.

Package Switching

Package switching is the shift from single-use plastic packaging to alternative materials – e.g., paper, glass, metal, compostable materials, or more readily recyclable forms of plastic – undertaken to meet the law's recycling-rate requirements. Because of the research and investment needed – and the fact that most alternatives cost more per unit than the plastic they replace – switching raises producers' packaging costs, and a significant portion of those costs are ongoing. This is the single largest area of disagreement between our analysis and the SRIA, and the one where the SRIA's treatment is, in our view, least defensible.

The SRIA's switching cost estimates methodology is inconsistent with the underlying documents it used. For its switching estimate, the SRIA states that it relied on a published cost methodology developed for the “Plastic IQ” tool, which provides per-ton cost figures for switching plastic to each alternative material. That methodology is explicit that its per-ton figures are ongoing annual costs: the higher operational and amortized capital expenses of making a package from glass, paper, or metal instead of plastic is incurred every year the product is produced.

The SRIA instead treated switching as a one-time cost. It multiplied the tons of plastic switched at each milestone during the implementation period by a per-ton switching cost and summed the result to reach about \$10.2 billion, with essentially nothing thereafter. This treats a recurring annual cost difference as though it only needs to be paid once. The consequence is twofold: the cumulative cost through 2031-32 is understated, and – just as importantly – the SRIA shows the switching cost disappearing after the transition, when, in reality, the higher material cost continues indefinitely.

The SRIA's scenario analysis avoided challenging questions about impacts of packaging switching. A second weakness is the way the SRIA handled the question of which packaging materials would be viable alternatives to the single-use plastic currently in use. A serious switching analysis would consider, for each category of single-use packaging, which substitutions are most plausible based on the technical requirements of different products, the relative costs of materials, the effectiveness of the substitute in terms of minimizing spoilage and damage, and the availability of markets to receive them. The SRIA did not conduct this important analysis. Instead, it simply distributed the switched plastic across five destination materials – in effect assuming each single-use plastic packaging is replaced by glass, metal, paper, compostable materials, and recyclable plastic in roughly equal proportions.

This simple averaging approach lets the analysis sidestep the crucial question that arises across many of the largest covered-material categories: whether a workable non-plastic alternative actually exists. For example, plastic is widely used in food packaging not principally for cost or weight but because of its functional performance – specifically, its ability to limit oxygen and moisture transfer in ways that extend shelf life, reduce spoilage, and lower food waste.

The peer-reviewed literature on this point is substantial. A 2024 scoping review in the *International Journal of Life Cycle Assessment* found that shelf-life extension was the packaging attribute most frequently evaluated for food waste impacts and played an important role in preventing waste across animal-based products (meat and dairy) and highly perishable produce.⁷ A case study published the same year in *Cleaner Environmental Systems* found that packaging chicken meat in a PET tray under a modified atmosphere extended shelf life from six to fifteen days, reducing food waste from 47 percent to 15 percent and lowering the associated climate footprint by roughly 78 percent.⁸ Modified-atmosphere packaging – almost always built on multilayer plastic films with specific gas-barrier properties – typically doubles fresh red-meat shelf life and can extend it three-fold or more for vacuum-packed primal cuts.⁹ These functions do not transfer to paper, glass, metal, or compostable alternatives at comparable cost.

This issue is not hypothetical: CalRecycle's previous regulations included a broader categorical exclusion for food and agricultural packaging, which the agency narrowed substantially in its January 2026 revision by adding the word "mandatory" before "federal regulations" and a three-pronged "no reasonably possible alternative" test – changes the produce industry characterized as effectively eliminating the categorical-exclusion pathway and which leave food packaging subject to the law's source-reduction and recycling targets except in a narrow case-by-case showing of conflict with binding federal food-safety law.

⁷ (Hemachandra, Hadjikakou & Pettigrew, *International Journal of Life Cycle Assessment*, vol. 29, pp. 1899–1915, 2024)

⁸ Tetteh, Balcells, Sazdovski, Fullana-i-Palmer, Margallo, Aldaco & Puig, *Cleaner Environmental Systems*, vol. 13, article 100197, 2024

⁹ Hernández-García, Vargas & Torres-Giner, *Foods*, vol. 11, article 426, 2022; National Cattlemen's Beef Association, "Beef Shelf-Life" research fact sheet, Beef Research Council; Linde Industrial Gases, MAPAX technical guidance for meat and poultry packaging

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CMC's Estimate

Figure 5 (next page) shows the explicit adjustments we made to the SRIA estimate related to plastic package switching. We estimate that costs over the six-year implementation period will be \$23.4 billion more than the SRIA estimate. This increase is related to three factors: First we re-estimated the switching cost using the Plastic IQ methodology, which, in contrast to CalRecycle, assumes that that switching costs are ongoing rather than one-time. This adjustment added \$6.7 billion over the implementation period. Second, we updated switching costs to reflect the inflation-related increase in commodity prices between 2021 and 2026, which added another \$6.0 billion over the implementation period. Third, we included economic losses associated with increased spoilage that will occur as food producers and retailers switch to packaging with less favorable anti-spoilage qualities.

Figure 5
CMC Adjustments to SRIA's Package Switching Estimate
(Cost \$ in Millions; Household \$ Are Actual)

Cost Centers	Total 2026-27 through 2031-32	Annual/ Household
SRIA	\$10,200	\$123
CMC Adjustments		
• CMC modeling	\$6,700	\$81
• Commodity inflation	\$6,000	\$72
• Spoilage	\$10,700	\$129
Total CMC Adjustments	\$23,400	\$283
Revised Total	\$33,600	\$406

Spoilage losses. We estimate that annual losses from packaging switching will reach \$2.8 billion by the time SB 54 regulations are fully phased in. Over the six-year implementation period the total is \$10.7 billion. Our spoilage estimate is based on the following assumptions:

- California consumers spend roughly \$55 billion annually on food categories where plastic packaging affects shelf life.¹⁰

¹⁰ "BLS Consumer Expenditure Survey 2024 (Tables A and 1101), <https://www.bls.gov/news.release/cesan.nr0.htm>, per-household figures applied to 13.8 million California households (U.S. Census Bureau, American Community Survey 2024). California spending adjusted upward by 15% to reflect higher state food prices versus the national average. Fresh produce categories are excluded – see WRAP UK (2022), 'Reducing Household Food Waste and Plastic Packaging,' which found packaging does not extend shelf life for most fresh produce items, <https://www.wrap.ngo/resources/report/reducing-household-food-waste-and-plastic-packaging>."

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- About 84% of that spending is on products currently in single-use plastic packaging.¹¹
- Mandatory switching will result in an average 19.4 percent reduction in shelf life.¹² This is based on the assumption that producers shift 25 percent to non-plastic, 40 percent to mono-material plastic, 10 percent is eliminated, and 25 percent continues to be multi-layered plastic, with producers absorbing any fees.¹³
- There is a 0.5 percent elasticity relationship between reduction in shelf life and spoilage rates (meaning that each 10 percent of shelf life lost translates into a 5 percent increase in spoilage).¹⁴ This yields a 9.9% increase in spoilage rate.
- About 60% of food spoilage translates into actual consumer cost. The rest is offset through alterations in business and consumer strategies.¹⁵

Recycling Infrastructure

This area covers the physical system that collects used packaging, sorts and processes it, and delivers it to “end markets” – the facilities that turn recovered material back into usable feedstock or products. Meeting SB 54's 65 percent recycling rate requires this system to handle more volume and types of material than it does today. The adjustments in this area draw solely on costs identified by the Needs Assessment produced by HF&H Consultants. Our contributions in this section involved (1) identifying and “backing out” overlapping areas where both the SRIA and the Needs Assessment covered similar costs but from different angles, and (2) transforming some of the Needs Assessment's per-facility costs into cumulative costs over the implementation period.

¹¹ "AMERIPEN/VCMI (2017), *Quantifying Packaging's Potential to Prevent Food Waste*, Tables 2-5 and 3-3, <https://vcmi-international.com/wp-content/uploads/2023/08/Quantifying-Packagings-Potential-to-Prevent-Food-Waste-May-2017.pdf>. Meat categories reported at 67-78% plastic-packaged; dairy/eggs at 99% packaged with approximately 85% in plastic; frozen foods at approximately 99% packaged with approximately 90% in plastic."

¹² Reduction in shelf life estimates from Tetteh, Balcells, Sazdovski, Fullana-i-Palmer, Margallo, Aldaco & Puig (2024), 'Environmental comparison of food-packaging systems: The significance of shelf-life extension,' *Cleaner Environmental Systems* 13:100197; Hernández-García, Vargas & Torres-Giner (2022), 'Quality and Shelf-Life Stability of Pork Meat Fillets Packaged in Multilayer Polylactide Films,' *Foods* 11(3):426, <https://doi.org/10.3390/foods11030426>.

¹³ Channel shares reflect the model's central compliance assumption: 25% non-plastic substitution, 40% mono-material recyclable plastic, 10% elimination or reuse-refill, 25% remaining conventional multilayer plastic with producers absorbing PRO fees. Reduction in shelf life estimates from Tetteh, Balcells, Sazdovski, Fullana-i-Palmer, Margallo, Aldaco & Puig (2024), 'Environmental comparison of food-packaging systems: The significance of shelf-life extension,' *Cleaner Environmental Systems* 13:100197; Hernández-García, Vargas & Torres-Giner (2022), 'Quality and Shelf-Life Stability of Pork Meat Fillets Packaged in Multilayer Polylactide Films,' *Foods* 11(3):426, <https://doi.org/10.3390/foods11030426>.

¹⁴ See, for example, AMERIPEN/VCMI (2017) citing WRAP UK research that one additional day of shelf life reduces avoidable food waste by approximately 5%, which corresponds to an elasticity of roughly 0.3-0.7 across typical 5-15 day product shelf lives. Tetteh et al. (2024) chicken found that a 60% shelf-life reduction was associated with an absolute 32-percentage-point increase in food waste, implying an elasticity of approximately 0.53. We excluded from our model fresh produce categories from our estimate based on results from WRAP UK (2022), 'Reducing Household Food Waste and Plastic Packaging,' which found that packaging did not extend shelf life for fresh produce categories such as apples, bananas, broccoli, cucumber, and potatoes.

¹⁵ These changes include tighter product inventories and more frequent customer trips to the store, both of which themselves have economic and environmental impacts.

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The CalRecycle SRIA estimates the total costs for collection, sorting, and processing infrastructure to be just \$2.4 billion over the six-year period ending in 2031-32. The components of this estimate are highlighted in **Figure 6** below.

Figure 6
SRIA Estimate of Recycling Infrastructure Costs
(Total \$ in Millions; Household \$ are Actual)

SRIA Infrastructure Cost Category	Total 2026-27 thru 2031-32	Annual Cost/ Household
Collection (recycling stream)	\$155	\$1.9
Collection (disposal stream savings)	-\$201	-\$2.4
Sortation (MRFs)	\$938	\$11.3
Sortation (composting)	\$11	\$0.1
Processing	\$1,500	\$18.1
Total Infrastructure	\$2,403	\$29.0

Additional Costs Found in Recycling Infrastructure Needs Assessment

The Needs Assessment, commissioned by CalRecycle and prepared by HF&H Consultants, reaches a starkly different conclusion from the SRIA about infrastructure costs. Its analysis, based on a detailed review of 7 major categories, identified additional costs that we estimate total up to between \$4.9 billion to \$8.4 billion over the implementation period. These cost increases are shown in **Figure 7** and discussed below.

Figure 7
Additional Costs in the Recycling Infrastructure Needs Assessment
(Total \$ in Millions; Household \$ are Actual)

Cost Category	Total 2026-27 thru 2031-32	Annual Cost/ Household
SRIA Estimate	\$2,400	\$29
Additional Costs in Needs Assessment		
• Plastic end market development	\$1,000 - \$2,200	\$12 - \$27
• Recycling processing facility upgrades	\$1,300 - \$1,700	\$16 - \$21
• Secondary processing facilities	\$845	\$10
• Organics processing facility upgrades	\$150 - \$400	\$2 - \$5
• End market investment for switching strategy	\$670 - \$1,500	\$8 - \$18
• Expanded curbside collection	\$1,000 - \$1,750	\$29
Cumulative Increase	\$4,965 - \$8,395	\$60 - \$101
Revised Total	\$7,365 - \$10,795	\$99 - \$130

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Plastic end market development. The most substantial single omission from the SRIA in the recycling infrastructure category is the cost of investment in end markets for plastic covered material. Plastic end markets are the facilities that convert recycled plastic feedstock into resin or finished products – the demand-side counterpart to the collection and processing system that the SRIA does address. Without functioning end markets at adequate scale, plastic material that is collected and sorted under SB 54 cannot be recycled, and the Act's recycling rate requirements cannot be met.

The Needs Assessment estimates that the ongoing annual funding gap for plastic end market development reaches between \$238 million and \$539 million per year by 2032, varying by milestone year and cost scenario. The largest single component is flexible and film plastics, where the 2032 annual funding need alone is estimated at \$135 million to \$287 million.

These figures represent the ongoing annual cost of operating recycled-plastic end markets at scale, not a one-time investment. For each material category, the Needs Assessment built up a per-ton operating expense, which included amortized capital costs and an operating margin. It then netted out resin-sales revenue. The resulting per-ton amount was then multiplied by the total tons expected to reach end markets each year. The SRIA's own regulatory-text discussion acknowledges that these end market development costs were not quantified in that document.¹⁶

This leads to an estimated total cost of \$1.0 billion to \$2.2 billion over the implementation period. We derived the total through a linear interpolation of the Needs Assessment figures developed for 2028, 2030, and 2032.

Recycling processing facility upgrades. The Needs Assessment estimates that upgrades to California's existing 89 recycling processing facilities will cost approximately \$447 per year on an ongoing basis. These upgrades are needed to enable these facilities to handle the higher quantities and additional types of covered material required to meet the Act's recycling rate requirements. This is an ongoing annual cost that includes operating expenses (mainly added sortation staffing) plus amortized capital investments for equipment and building modifications.

The SRIA addresses recycling processing infrastructure through a separate line item: \$938 million in cumulative implementation costs through FY 2031–32 for the construction of 8 new large Material Recovery Facilities (MRF), 4 new medium MRFs, 2 new small MRFs, and the expansion of approximately 53,000 tons per year of capacity at existing facilities (SRIA Addendum, p. 12).

The Needs Assessment and SRIA estimates address different activities even though both fall nominally within the same cost category:

¹⁶ The SRIA Addendum discussion of Section 18980.4 (Responsible End Market Criteria), Section 18980.4.1 (End Market Identification), and Section 18980.4.3 (End Market Development) each state that CalRecycle was "unable to incorporate this impact into the DIM to quantify these impacts due to the unavailability of the required data" (SRIA Addendum, pp. 34–36).

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- The SRIA's \$938 million is a cumulative figure focused on construction of new MRFs and modest expansion at existing facilities.
- The Needs Assessment's \$447 million per year is an ongoing annualized cost applied across the existing infrastructure of 89 facilities, reflecting upgrades to enable each facility to handle additional material types and quantities.

There is likely some overlap between the two estimates, particularly with respect to the SRIA's 53,000 tons per year of expansion at existing facilities, which may correspond to a portion of the Needs Assessment's facility upgrade scope. To avoid overstating the net increase in costs, we are applying a 25% to 40% reduction to the Needs Assessment figure to account for potential overlap with the SRIA's MRF expansion line item.

We estimate a net increase of \$1.3 billion to \$1.7 billion over the implementation period (gross increase of \$2.24 billion before overlap adjustment).

Secondary processing facility investments. The Needs Assessment identifies a need for 13 new secondary processing facilities for plastics in California. These facilities would receive approximately 978,000 tons per year of mixed plastic bales from primary MRFs and Mixed Waste Processing (MWP) facilities, performing additional sortation to produce material grades suitable for end markets. Total capital cost is estimated at approximately \$65 million per facility, or \$845 million across all 13 facilities.

The SRIA's \$938 million sortation cost is concentrated on primary MRFs; the SRIA does not appear to address the secondary processing tier that the Needs Assessment identifies as necessary to recover mixed plastics and flexible films.

The Needs Assessment does not provide an ongoing operating cost figure for secondary processing facilities. This contrasts with its treatment of MRF upgrades and MWP facilities, each of which include both capital and operating costs on an annualized basis. If secondary processing facilities were treated on a comparable amortized basis, the all-in cost would likely be 1.5 to 3 times higher than the \$65 million per facility capital figure.

Organics processing facility upgrades. The Needs Assessment describes the equipment, infrastructure, and staffing upgrades needed at California organics processing facilities (OPFs) to handle additional covered material, particularly fiber-based materials such as old, corrugated cardboard, kraft paper, mixed paper, and molded pulp. The methodology is parallel to that used for recycling processing facilities: amortized capital plus operating costs, expressed as a per-ton annual cost.

Unlike the analysis of recycling processing facilities, however, the Needs Assessment does not produce a statewide rollup of total OPF upgrade costs. Equipment costs range from \$200,000 to \$1.5 million per item and infrastructure costs from \$25,000 to \$40 million per item, but these per-facility ranges are not aggregated into a statewide total.

The SRIA addresses OPF infrastructure through an \$11 million cumulative implementation cost for composting facility expansion through FY 2031–32 (SRIA

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Addendum, p. 12). Given the per-facility cost ranges identified in the Needs Assessment, this figure appears to address only the modest scope of new compostable capacity the SRIA's tonnage flow model contemplates (45,612 tons by 2032), and does not appear to address upgrades at the broader population of OPFs that would be required to handle additional fiber-based covered materials and any compostable plastics directed to the organics stream.

With over 200 permitted organics processing facilities in California, modest upgrades at even a fraction of them – 20 to 40 facilities at \$1 million to \$3 million each, amortized over 10 years at the Needs Assessment's stated 11% interest rate – would imply ongoing annual costs in the \$30 million to \$80 million range. Over the 2026-27 through 2031-32 implementation window, this implies approximately \$150 million to \$400 million in costs beyond the SRIA's \$11 million figure.

End market investment for material switching strategy. As noted earlier, the SRIA estimates \$10.2 billion in material switching costs – the cost to producers of converting plastic packaging to non-plastic alternatives (paper, metal, glass, compostable) and to recyclable plastic alternatives.

The Needs Assessment identifies important areas where additional end market investment will be needed to make the switching strategy viable:

- **Aseptic and gable-top cartons:** the Needs Assessment notes that "only one local facility was identified which will soon begin accepting aseptic and gable-top cartons" – the Lodi facility, with a capacity of approximately 9,000 tons per year. Switching to carton alternatives at any meaningful scale would require new capacity well beyond this single facility.
- **Paper and fiber with plastic components:** approximately 83% of paper and fiber covered material with plastic components is currently exported internationally. The Needs Assessment contractor assumed that the foreign markets would not meet the "responsible end markets" criteria set forth in the regulation. Thus, domestic capacity expansion would be required to repatriate this stream. The Needs Assessment evaluated several options in this area and settled on a conversion of these recycled materials into construction products, such as roof insulation panels, citing one facility in Lodi that is expected to begin operations in 2026 as a leading example.
- **Compostable plastics:** the Needs Assessment found that 9 of 19 surveyed OPF operators are unwilling to accept compostable plastics under any circumstances, and those willing to accept them indicated they would require bifurcated processing lines or new buildings. Switching to compostable alternatives at scale would require substantial new investment in end market infrastructure.

Metal end markets, by contrast, are characterized in the Needs Assessment as "effectively recycled at no additional system cost as this process is typically profit-generating," and existing capacity for general (non-carton) paper and glass is reported as broadly adequate.

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The SRIA's material switching worksheet distributes the 1.4 million tons of switched plastic equally across five destination categories – recyclable plastic, paper, metal, glass, and compostable. This implies approximately 280,000 tons per year of additional material flowing to each destination by 2032. Applying the Needs Assessment's per-facility cost ranges to the categories where additional end-market investment is needed yields the following over the 2026-27 through 2031-32 window:

- Carton end-market capacity: approximately 6 to 7 new facilities at Lodi scale, at an estimated \$15 million to \$25 million per facility – approximately \$100 million to \$175 million.
- Compostable end-market capacity: approximately 18 to 25 new or substantially upgraded facilities at \$15 million to \$25 million each – approximately \$270 million to \$625 million.
- Additional plastic end-market capacity to handle the approximately 280,000 tons per year of material switched to recyclable plastic alternatives – approximately \$225 million to \$500 million.
- Glass small-format and general paper end-market upgrades to handle the increased switched volumes: approximately \$75 million to \$175 million.

Overall, this category will add \$670 million to \$1.5 billion over the implementation period. This figure is not double-counted with the SRIA's \$10.2 billion material switching cost, which captures only the producer-side cost of converting packaging from plastic to alternative materials. The end-market capacity needed to receive and process alternative recyclable materials at scale is a separate cost category not addressed in the SRIA.

Expanded curbside collection (SB 54-attributable portion). The Needs Assessment estimates that providing onsite curbside collection of recycling and organics streams to currently non-participating generators would cost approximately \$1.89 billion per year statewide if fully implemented. The Needs Assessment identifies approximately 175,108 residential and 80,712 commercial generators currently not participating in recycling collection, and approximately 583,794 residential and 185,115 commercial generators not participating in organics collection.

Only a portion of these expansion costs are directly attributable to SB 54. For example, two-thirds of the \$1.89 billion annual total is already required by SB 1383, an existing law requiring curb-side pickup of organics. We estimate that the SB 54-attributable share of the total expansion is \$200 million to \$325 million per year. Over the 2026-27 through 2031-32 window, this totals to approximately \$1.0 billion to \$1.75 billion.

The SRIA's collection infrastructure analysis yields a net savings of \$46 million through FY 2031–32, recognizing \$155 million in increased recycling stream collection costs offset by \$201 million in disposal stream cost reductions (SRIA Addendum, p. 11). The SRIA's analysis does not appear to address the incremental cost of providing service to currently non-participating generators, which the Needs Assessment quantifies separately.

Total recycling infrastructure costs. Putting together the additional costs documented in this section yields cost increases relative to the SRIA's \$2.4 billion estimate of between \$5.0 and \$8.4 billion over the 2026-27 through 2031-31 window. Revised total recycling infrastructure costs reach between \$7.3 billion and \$10.8 billion over this timeframe.

Producer Reporting

The SB 54 regulations require producers to track and report detailed data on their packaging and to maintain extensive records. The SRIA estimates the cost of this reporting at about \$99.6 million over the implementation period, or about \$2,478 per large producer per year.

This is a small line item against the overall cost total, and it does not move the per-household figure by more than a dollar or two. However, it further illustrates the same pattern of idealized assumptions used throughout the SRIA.

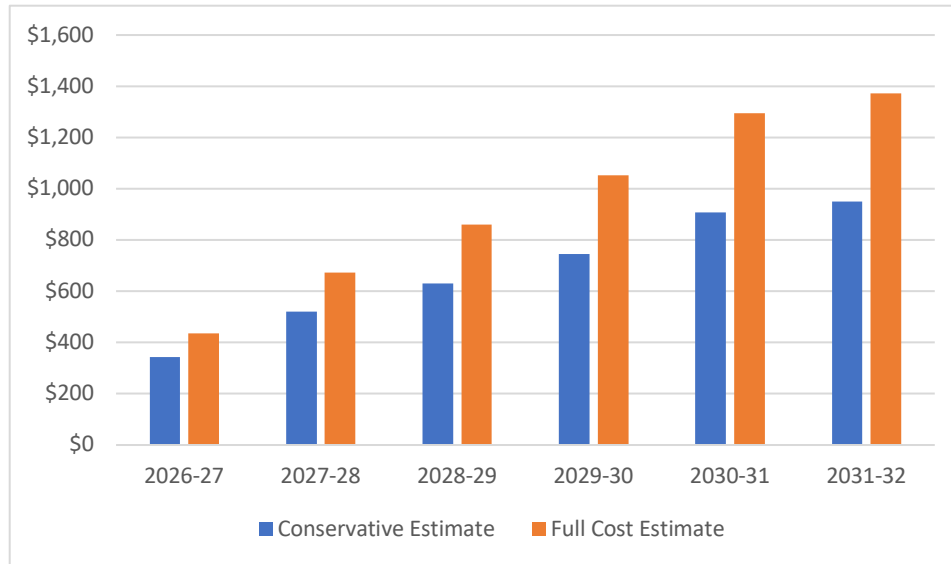
Roughly \$2,478 per year buys about 16 to 25 hours of staff time – a few days at most. The regulations require considerably more: producers must report, for each material category, the weight of packaging, the weight recycled and disposed, and the number of plastic components, a figure companies do not ordinarily track and must build new systems to capture across their entire product range. The estimate also appears to omit the first-year cost of building those data systems and the cost of supporting the independent third-party verification the regulations require. Based on operating producer responsibility programs in other states and abroad, compliance software alone runs \$15,000 to \$50,000 per year and audit response consumes dozens of staff hours. We believe a more realistic figure is in the range of \$150 million to \$350 million, with a central estimate of around \$230 million. This is two to three times the SRIA's number.

Annual Household Costs Over The Implementation Period

As noted previously in Figure 3, we estimate that average annual cost per household ranges from \$683 to \$955 over the 2026-27 through 2031-32 period. These are averages for the full implementation window, held down by relatively low costs in the early implementation years. **Figure 8** shows these annual house cost increases by year. It indicates per-household costs will rise from between \$343 to \$437 in 2026-27 to between \$951 and \$1,373 by 2031-32. In contrast to the CalRecycle SRIA estimates, we believe that annual costs will persist indefinitely into the future.

Figure 8
Annual Household Cost Increases By Year From SB 54 Regulations

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PRO's Initial Program Plan

On June 15, 2026, Circular Action Alliance (CAA) submitted its first formal California EPR Program Plan to the Producer Responsibility Advisory Board, which includes a preliminary five-year program budget totaling \$9.4 to \$17.2 billion. While CAA's budget figures appear, at first glance, to be much lower than the costs estimated in this report, the difference occurs because the two analyses are measuring fundamentally different concepts. This report estimates the *full cost to California households* of compliance with SB 54, measured across every channel through which the law's burden flows. CAA's total includes only the subset of activities funded through producer fees collected and disbursed by the PRO itself, which by design captures only a portion of the law's total cost. The budget excludes the substantive cost of source reduction — substitution, lightweighting, elimination, and package redesign, facilitation of consumer returns — which CAA explicitly states will be “born directly by producers and have no impact on the net program budget.” Package switching costs are likewise absent from the budget, since they are direct procurement costs paid by producers to their packaging suppliers. The majority of the producer cost burden this report identifies therefore does not appear in CAA's published figures — not because CAA disagrees about whether the cost exists, but because CAA's budget tracks only the portion that flows through PRO fees.

In addition, the CAA plan is, by its own description, based on a compliance pathway that necessitates that CalRecycle will grant a significant number of regulatory exemptions due to the fact that compliance mandates are not possible. The plan submits exemption applications for 56 Covered Material Categories seeking either deferrals of the 2028 and 2030 interim recycling-rate targets or phase-out of materials CAA has concluded lack a viable pathway to compliance. CAA will also seek a three-year delay of the 10 percent source reduction target due in 2027, including its embedded reuse and refill requirement. Such a delay may almost-certainly be followed by an additional delay of the 2032 targeted reduction of 25 percent.

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In the one substantive area where CAA's budget does fund implementation — collection, sorting, processing, and end-market infrastructure — CAA's figures are broadly consistent with the costs identified in this report for the comparable period. CAA itself acknowledges, however, that this funding level is insufficient to achieve the 65 percent recycling rate target by 2032. The program plan states that “California's recycling system will not fully achieve SB 54 recycling rate targets through source-separated pathways alone — particularly for plastics,” and CAA's own research finds in-state processing capacity in 2032 standing well below the volume needed for the major plastic categories. Additional infrastructure investment will therefore be required in CAA's next program plan period and beyond, above what the current budget contemplates. CAA's program plan is, in this sense, the first formal acknowledgment from the entity charged with operating SB 54 that the law's statutory targets will not be met and that it cannot meet the objective to build a holistic system to address and manage single use packaging waste. However, billions of dollars will be collected and spent to invest and expand the largely already existent infrastructure for materials for which there was already a circular pathway available.

Conclusion

CalRecycle's June 2025 SRIA estimates that the SB 54 regulations will cost the average California household about \$190 per year. Our evaluation finds that this figure rests on idealized assumptions — such as high return rates, smoothly functioning markets, mostly adequate existing infrastructure, and one-time rather than ongoing costs — that do not reflect the conditions California faces today. Correcting for these assumptions, we estimate the regulations will cost between \$683 and \$948 per household per year over the 2026-27 through 2031-32 implementation period, or 3.6 to 5.0 times the SRIA's estimate.

The sharp increase reflects, to a significant degree, CalRecycle's own subsequently commissioned technical work. The Needs Assessments prepared by Eunomia and HF&H Consultants examined the source reduction and recycling infrastructure areas facility by facility and material by material and found combined costs in these areas to be two to three times higher than the SRIA's estimates. Our remaining adjustments primarily correct a methodological inconsistency in the SRIA's largest cost category — package switching — where an ongoing annual cost difference was treated as though it occurs only once. They also include adjustments for notable increases in material costs, lower return rates, and spoilage consequences of packaging switching in the case of certain food products.

Two aspects of these higher average annual household costs are significant. First, they are not temporary. The SRIA shows annual costs peaking in 2030-31 and falling nearly to zero the following year; in reality, the higher cost of alternative materials, expanded reuse operations, and recycling infrastructure will continue indefinitely. Second, the costs rise sharply across the implementation window — from roughly \$343 to \$437 per household in 2026-27 to between \$951 and \$1,373 by 2031-32 — as the law's reuse and recycling requirements take full effect. As noted in the previous section, the initial PRO program plan is a tacit admission that the SB 54 regulations are simply not feasible.

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For households, the practical effect will resemble a regressive tax, falling on a wide range of packaged goods and weighing most heavily on lower- and moderate-income families already absorbing high costs for food, housing, and energy.