

# Regulation and Recycling:

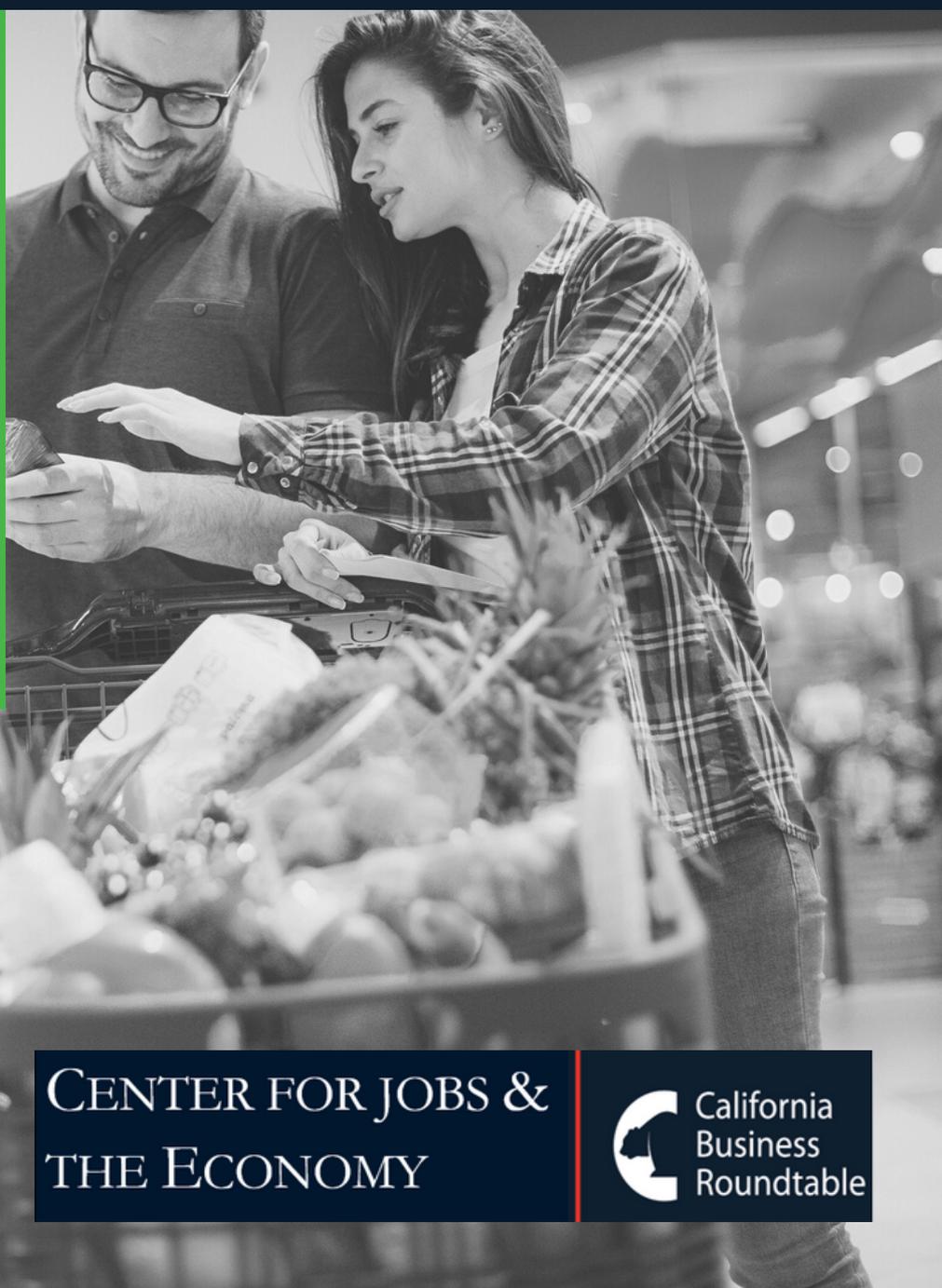
## The Impact of Initiative #19-0028A1 on Direct and Indirect Cost Increases for Consumers, Businesses and the California Workforce

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Prepared by

Center for Jobs  
& the Economy

Executive Summary



CENTER FOR JOBS &  
THE ECONOMY



California  
Business  
Roundtable

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# Introduction & Summary

## Estimated Annual Costs: Summary Total

Source: see text; all dollar amounts (except per household) in millions

Cost Component	Tax	Other Direct	EPS Cost	2030 Cost	Total Cost
Foodware	\$816		351	\$34	\$1,201
Bottles & Containers	286				286
Meat, Fish & Poultry Packaging	46				46
Other Packaging	3,096			119	3,215
Compliance					
Recycling/Composting Capacity		548			548
Data & Reporting		3,400			3,400
General Fund Appropriation		200			200
Total (million)	\$4,286	\$4,148	\$351	\$153	\$8,895

### Equivalent Cost for Household of 4:

Additional Annual Costs Paid Under the Measure	\$901
Annual Costs Already Paid for Recycling Programs (core taxes and fees)	\$567
Annual Costs Already Paid for Recycling Programs (w/ greenhouse gas taxes)	\$780

**Imposes Taxes & Limits on Single-Use Plastic Foodware & Packaging.** The proposed measure imposes a new tax on each piece of single use plastic packaging and plastic foodware, bans the use of certain single use plastic foodware, requires each producer to reduce the use of these items 25% by number and weight by 2030, and requires the remainder of these products to be reusable, refillable, recyclable, or compostable by 2030. These taxes will be in addition to multiple state and local taxes and fees consumers and businesses already pay on the goods they buy, including a wide range of other recycling and refund fees, bag fees, excise taxes, and sales and use taxes.

**Direct Annual Costs of \$8.9 Billion.** From the table above, direct costs to California businesses and households are estimated at \$8.9 billion annually consisting of: (1) \$4.3 billion in higher taxes; (2) \$4.1 billion in higher other direct costs to expand required recycling collection and sorting, comply with the extensive data and reporting requirements, and maintain general fund expenditures at specified state agencies; and (3) \$0.5 billion based on expected costs to replace non-complying materials on a lowest-cost alternative basis.

**More than Doubles what Californians Now Pay for Recycling Programs.** To put these costs into perspective, estimated costs of the measure are the equivalent of \$901 per household of four, paid directly and indirectly including through higher costs for most if not all of the goods they buy. These costs are on top of the estimated \$567 per household of four already paid each year in taxes and fees for the current recycling and source reduction programs if the greenhouse gas tax is not included, and \$780 annually if it is. Based on recent inflation impact numbers calculated by Wharton Model, lower income households will see a relatively higher increase in these costs.

**Proposes One of Largest Tax Increases in Recent Years.** To put the estimated \$4.4 billion tax increase in perspective, State Controller data indicates that the largest recent tax increase—Prop. 55 (income taxes)—increased tax revenues by about \$6 billion a year. But unlike Prop. 55 that only applies to high income individuals, the costs from this measure will be paid by every household. SB 1 (Chapter 5, Statutes of 2017) raised fuel taxes initially by \$4.4 billion, and by \$5.5 billion at full implementation in 2020.

**Cost Estimates Based on 2019 Base Year.** Costs are estimated from base year 2019 conditions to avoid distortions from attempting to project across the pandemic period. Escalating them using Department of Finance inflation forecasts to 2022 when the tax would become effective retroactively, the costs would be \$9.4 billion annually, or \$940 per household of four.

**Cost Estimate May be Much Higher, Depending on How Undefined Terms are Clarified.** The costs will vary depending on how CalRecycle subsequently defines the various terms in the measure. For example, the cost estimates assume—consistent with the Department’s actions in the recent SB 1335 (Chapter 610, Statutes of 2018) regulations—that rigid plastics will be defined as recyclable for the purposes of the 2030 requirements, as the result of the increased recycling capacity and market development the measure is proposed to achieve. If 2030 requirements instead are defined to require fully recyclable and compostable materials from renewable materials, the costs for replacing EPS by food vendors alone would increase from \$351 million annually to \$690 million. The 2030 replacement costs would be substantially higher.

**Costs Not Included in the Estimate Push the Total Higher.** The measure includes other provisions that will push the costs even higher, but no estimates are included as these are more speculative. The primary factor is that individual producers must reduce their use of the covered materials both by weight and volume by 2030 based on their use in 2023. Costs will depend on whether the state economy and more importantly individual companies are still attempting to recover in 2023, and will vary considerably by company size with larger corporations likely to have more options across their different product lines and smaller companies instead faced with the need to reduce product offerings, shift company operations, or even reduce sales in order to avoid the hefty fines under this measure. Other provisions are the additional authorities given to CalRecycle, including: (1) mandate take-back programs and additional fees without the Legislature’s approval; (2) mandate minimum content, product reformulations, and product redesigns both on individual producers and product categories without the Legislature’s approval; and (3) create new labeling standards that conflict with current federal requirements.

**These Additional Authorities Remove Checks and Balances on CalRecycle & Allow Them to Raise Costs in the Future.** The department is given broad authority to raise additional taxes and fees administratively to expand programs for any of the broad purposes under the measure. The department can also dictate how any good is packaged or sold in the state, raising its costs even more.

**Higher Taxes Will Vary Widely by Product Sold.** The tax will vary by each item of final goods sold as it: (1) applies to every step in the goods cycle process from raw materials and components to production, transportation, and final display and sale; (2) is counted from the individual pieces of plastic packaging used rather than by each item sold; and (3) applies to single use packaging made

wholly or partially from plastics, meaning even items such as paper hot cups will be subject to the tax due to the PE<sup>1</sup> or bioplastics coating used in these products.

**Only About 30% of Tax Goes to Recycling & Reducing Plastic Packaging.** Revenues generated by the tax would be allocated to a wide range of state and local programs. While a specific distribution will be subject to future state budget decisions, simply assuming equal allocation among the core purposes indicates that at most only about 30% of the funding raised from the new tax would go to plastics recycling or reducing current single-use plastics packaging use in the state. Administrative costs to most state and local agencies are capped at 5% of their allocations, but there is no limit to the funds that can be spent by CalRecycle to develop and implement regulations and to collect, administer, and enforce the new tax.

**No Guarantee the Money will be Spent for the Purposes Voters Approve.** Even if voters approve this measure, there is no guarantee that even 30% will be spent on reducing plastics use and plastic pollution in the state. As a statutory initiative, the legislature can change any part of this measure—how high the taxes can be raised, budget allocations of the funds to other legislative priorities—with a two-thirds vote of each house. When funds were short for other priorities in the past, the legislature has redirected other recycling taxes of this type to other purposes and even in normal budget years approved spending with only a tangential relationship to the intended purpose.

**Spending Another \$8.9 Billion a Year Will Still Leave the State Short of Its Recycling Goals.** California as with the rest of the country lost ground under its current recycling programs even prior to the pandemic, going from 50% in 2012-2014 to 37% in 2019 and a brief uptick to 42% in 2020 due to how the numbers are calculated. Even assuming the measure is fully effective, the 2020 rate would only rise at most to 46%, well below the 50% recycling rate the state was supposed to reach by 2000 and the 75% rate by 2020. The actual potential is lower as the waste numbers used to calculate this gain covers more than the materials that will be subject to the measure.

**Californians Will Be Asked to Spend Even More in the Future.** While claiming to be a comprehensive solution to plastic wastes, the measure will only apply to about two-thirds of plastics currently sent to landfills or littered. Californians are asked to spend another \$8.9 billion a year to cover only 4% of the wastes overall now going to landfills or being littered, and they will be asked to spend even more in the future if the state is ever to reach its 75% diversion goal. The estimated costs must be considered from this cost effectiveness factor—taxing and spending more to revive programs that have failed to meet their mandated goals, yet still doing little to reverse this trend.

**Measure Asks Californians to Spend Twice for Recycling Programs They Already Pay For.** The state's current recycling and other waste diversion programs presumably are sized to reach the 75% goal they were mandated to achieve by 2020. The measure expects California households and businesses to spend another \$8.9 billion on top of the estimated \$5.6 billion they already spend each year on these programs, \$7.7 billion if greenhouse gas funds—which are another source reduction tax levied by the state and that generates revenues that could be used for the various programs under the measure—are counted. Current recycling fees and taxes also have generated surplus funds that could be used for the same purposes as in the measure, ranging from \$710 to \$881 million in recent years and a much higher \$911 million to \$4.1 billion if the greenhouse gas fund is included. The

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<sup>1</sup> All abbreviations are listed in the Appendix.

measure expects California households and businesses to spend even more while achieving even less for programs already sized for the materials covered under this measure.

**Measure Misleads on the Amount of Plastics Now Diverted to Other Uses.** The measure and its proponents rely heavily on the contention that only 9% of plastics are currently recycled, relying on 2018 data from US EPA. That same data source indicates that a slightly higher share—13%—of plastics subject to the measure are recycled and that a much higher share—28% overall—are diverted to reuse rather than landfilled. The core difference is the amount used to generate waste-to-energy. As with the current programs, combustion is not allowed to count for the purposes of recycling under the measure. As worded and as previously interpreted by CalRecycle, this restriction is also likely to apply to advanced recycling technologies which in essence return plastic wastes to their component resins, chemicals, and fuels. Advanced recycling sets up a true circular economy as envisioned under the measure. Mechanical recycling as currently practiced instead produces a substantial share of downgraded recycling, turning potential resin feedstocks into products such as plastic lumber, buckets, and pails.

**Measure Misleads on the Amount of Plastics That Could be Diverted from Polluting the Oceans.** Preventing plastic wastes from going into the oceans is a key theme of the measure, but the language relies on global statements rather than the contributions currently coming from the state. Using a recent study cited by the UN, a detailed analysis of the terrestrial sources that would be covered by the measure indicates the overwhelming source of plastic pollution is from Asia (81%) and Africa and South America (13.5%) due to poor management of solid waste, landfill, and wastewater systems. Even if the measure was fully effective, plastic waste discharges to the oceans would decrease globally by only 0.02% annually. The measure is also not likely to be considered as a model to be adopted by the countries who are the largest source of the problem, due to the extremely high costs of its approach.

**Affects More than 40,000 Current Manufacturing Jobs in the State.** In 2019, there were 1,275 establishments engaged in the production of packaging subject to the measure, employing 40,159 wage and salary workers including 1,045 using recycled plastic resins. These industries employed a substantially larger share of Latino workers (56.5% vs. the state-wide average of 35.5%) and a larger share of workers with only a high school degree or less (51.2% vs. 37.9%). The key difference is that these industries paid an average annual salary of \$60,271, providing blue-collar middle-class wages rather than the minimum and above wages workers with less than a college education increasingly can expect as this type of middle-class wage job has declined overall in the state. Additional jobs affected by the measure include current suppliers to these industries and potentially jobs at end user businesses as they seek to reduce other costs such as labor in order to adjust. The primary determinant of the net jobs effect, however, will come as households shift consumption due to higher prices and a net reduction in their effective disposable incomes.

**Recycling Jobs are Declining in the State.** The measure is based on the contention that recycling currently supports 125,000 jobs in the state and that even more are possible through expansion of these programs. There is no reference for this estimate, but it appears to come from studies first citing the 125,000 jobs number at least in 2011, with no change despite the recycling rate falling from 58% to 42% in this period and the contention that another 65,000 would be added by the state's adoption of the 75% recycling goal. That number also appears to be the broadest possible accounting for jobs under "recycling," including regulatory jobs in government agencies, waste haulers, collection and sorting, reprocessing and remanufacturing, and even automotive and

appliance repair based on the presumption that by repairing products, their effective lives are renewed. Instead, using CalRecycle data, three decades of focused state policy and billions in annual fees and taxes imposed on households and businesses have produced a circular economy component that represents just over 3% of current (including materials other than plastic and paper) packaging establishments in the state. All recycled content businesses represent only 0.03% of total nonfarm establishments. High and growing operating costs in the state have caused many recycling businesses to close, with the most recent data showing that 42% (over 1,600) of the state convenience zones under the beverage container program are no longer served by a recycling center.

**Measure Creates Jobs but Not Necessarily in the State.** Use of US EPA data indicates the potential for new job creation would include up to 20,000 direct jobs using recycled plastics and 60 for composting the affected paper packaging, assuming a shift to fully compostable materials. Not all these would be created in California due to the high permitting, labor, energy, tax, and other operating costs in the state and the need for these products to produce at prices that while still higher, come closer to competitive levels with traditional plastics. Even under the current recycling programs, only 45% (13 million tons) in 2020 went to end uses defined as a consumer use or use of the materials as an input to production, construction, fuel, or other use, and up to 9 million tons of that amount consisted of compost. Instead, 40% of the diverted tonnage continued to be exported for conversion in other countries. Even if the focus of the programs instead become promotion of renewables rather than recycling, current projections for bioplastics capacity show that Asia will account for 70.8% by 2026, Europe for 16.9%, and North America only 8.5%.

**Measure Works at Cross Purposes to Job Claims.** The measure claims to produce jobs through both the expansion of businesses using recycled feedstock and businesses producing packaging using renewable materials. Under the measure, though, packaging using recycled content and packaging made from bioplastics will still be counted for taxation purposes and for compliance purposes with the requirement that each producer reduce single use packaging by 2030 based on both weight and number of items used in 2023. Companies developing around this recycling stream and/or renewables requirement will see their markets and source materials slashed just as they should be reaching profitability. Uncertainties over additional COVID strains still put the state's economic recovery by 2023 into question, with this requirement potentially having a far more restrictive effect over goods sold in the state moving forward. Investors clamor to get into growing markets, not ones that will be constrained artificially over time.

# Background

## Study Scope & Purpose

Statewide ballot measures eligible for the November 2022 election include Initiative 1877 (AG File #19-0028A1), Requires State Regulations to Reduce Plastic Waste, Tax Producers of Single use Plastics, and Fund Recycling and Environmental Programs, Initiative Statute. This measure would impose a new tax on each piece of single use plastic packaging and plastic foodware, ban the use of certain plastic foodware, reduce the use of these items 25% by number and weight by 2030, and require these products to be reusable, refillable, recyclable, or compostable by 2030.

This report assesses the potential costs of the proposed measure, focusing on the direct costs to households, businesses, and government agencies in California. To the extent possible given the time schedule and scope for this report, these costs are quantified in particular for: (1) costs arising from the new tax proposed in the measure and (2) net costs as existing single use plastic packaging is replaced with alternative materials. Costs associated with other changes coming from the measure are also discussed but in more qualitative terms.

## Proposed Initiative

The measure would enact the following provisions to be administered through the Department of Resources Recycling and Recovery (CalRecycle):

1. Beginning January 1, 2022, imposes a new California Plastic Pollution Reduction Fee:
  - One cent per item of single use plastic packaging and foodware that is not recyclable or compostable.
  - Up to one cent for items that are recyclable but not made with any bioplastics.
  - Up to three-quarters cent for items partially made with bioplastics.
  - Up to one-half cent for items wholly made with bioplastics.

These taxes are to be adjusted annually for inflation based on the California Consumer Price Index, which in the latest data for November 2021 is rising at an annual rate of 6.0%.

2. Taxes are to be paid by the producer, the definition of which may vary in accordance with several criteria. In practice for most items but particularly for the packaging applications, the “producer” is likely to be the entity selling or distributing a product in the state. Producers are prohibited from passing on the cost of the tax as a separately billed or invoiced item, but there are no provisions that would prohibit recovering this cost through other means such as raising the price of products sold in California. The measure instead prohibits businesses from informing consumers why prices are being raised.

3. Requires all single use plastic packaging and plastic foodware to be reusable, refillable, recyclable, or compostable by 2030. All terms are to be defined later by the department. Combustion (such as waste-to-energy) and fuel production using these high-Btu content materials—as done in other states and countries—does not qualify as recycling.
  - Single use plastic packaging covers packaging or components of packaging made partially or wholly from plastic including items used for the containment, protection, handling, delivery, or display of goods at every step of the production and sales process, ranging from raw materials to the final goods produced for sale.
  - Single use plastic foodware includes products made partially or wholly from plastic including clamshells, plates, bowls, cups, utensils, stirrers, straws, and lids.
4. Bans the use of expanded polystyrene foam foodware.
5. Requires at least a 25% reduction—by both weight and number of items—in the amount of single use plastic packaging and foodware sold in California by 2030. Each producer must meet this reduction based on their sales in 2023.
6. Requires producers to reduce or eliminate single use plastic packaging applications as the department later determines to be unnecessary for the delivery of a product or food item.
7. Beyond these specific targets, gives the department authority to require use of recycled content and renewable materials in specific applications.
8. Includes provisions intended to increase plastics recycling including authority to the department to mandate take-back programs and deposits and funding to increase recycling capacity. This authority would enable the department to impose additional taxes beyond those specified in the measure.
9. Creates new labeling standards for single use plastic packaging and foodware for purposes of sorting discarded materials.
10. Although the applicable section (42381(a)(8)) is poorly worded, the intent appears to be to give the department the authority to regulate the formulation of single use plastic packaging and foodware based on open-ended health and safety considerations.
11. Requires producers to register with the department and provide data the department deems appropriate.
12. The only packaging applications excluded from the measure are materials used for the containment of medical devices and prescription drugs as specified in the federal Food, Drug, and Cosmetic Act; infant formula; on-farm tertiary single use plastic packaging; and reusable plastic packaging as it is to be defined by CalRecycle.

13. CalRecycle also has the ability to exempt individual items from the measure's provisions based on a series of criteria.
14. Producers are responsible for ensuring compliance with the mandates in the measure. The department may impose an administrative civil penalty not to exceed \$50,000 per day for noncompliance with this measure or regulations the department subsequently issues.

Funds from the new tax are to be allocated as follows:

1. Up to 5% of total funds allocated to state agencies for specific purposes can be used for administrative costs. Additional administrative funds can be allocated with no cap: (1) to CalRecycle for development and implementation of the regulations and (2) costs for collection, administration, and enforcement of the new tax.
2. After deducting the costs for collection, administration, and enforcement of the new tax, the remaining funds are to be allocated to the following purposes:
  - Upon appropriation by the legislature, 20% to a Local Government Fund for groundwater, local clean drinking water supplies, abatement of litter and marine plastic pollution, local recycling and composting programs, education and outreach on waste diversion, and grants to organizations for various litter, public education, and waste diversion activities.
  - Through a continuous appropriation, 50% to a Recycling, Composting and Reuse Fund under CalRecycle to implement and enforce the measure; promote markets for recyclable and compostable materials through separate market development programs for plastics, glass, fiber (paper, cardboard, and others), and organic wastes; and a Circular Economy Grant Program covering recycling and composting infrastructure, deployment of reusable or refillable alternatives, healthy soils/water-smart practices in agriculture, restoration of degraded landscapes, and grants to organizations to prevent food wastes.
  - Through a continuous appropriation, 30% to an Environmental Mitigation Account under Natural Resources Agency for grants to state and local agencies to mitigate impacts of plastic pollution and open-ended uses for wildlife, habitat, and public access to the state's natural resources.
3. The measure also in practice makes additional general fund appropriations. The language includes the standard provision that the new revenues under the Environmental Mitigation Account are to enhance rather than replace existing funding. The measure goes beyond this typical provision by requiring that general fund appropriations remain at least at the levels in the Budget Act of 2019 for Natural Resources Agency, Ocean Protection Council, California Coastal Conservancy, Departments of Fish & Wildlife and Parks & Recreation, and Wildlife Conservation Board.

While actual allocations will depend on future budget decisions, simply assuming equal allocation among the many core purposes in each category indicates that at most, only about 30% of the

funding raised from the new tax would go to recycling or reducing current single-use plastics packaging use in the state. This estimate, however, also assumes the absence of pressure to allocate the new funds to tangentially compliant uses as is being done currently for similar funds such as the annual Cap & Trade auction proceeds.

While the measure uses the term “fee” in relation to this charge, this funding distribution, with only a small portion going to related purposes, instead indicates it is intended to function as a tax. Consequently, “tax” is the term used by the Legislative Analysts’ Office in their assessment of the fiscal impacts,<sup>2</sup> as well as the term used in the official title and summary.

## Recycling Programs Performance to Date

Beginning with California’s Integrated Waste Management Act in 1989 and with other states<sup>3</sup> one year earlier, the focus of state and local solid waste management has shifted from traditional practices such as disposal in landfills and combustion for waste-to-energy and process heat to manufacturing such as refractories. These programs instead have moved to devoting more state and local resources on waste diversion as implemented through recycling, reuse, and source reduction. In spite of this shift, disposal including disposal after export of “recycled” materials, waste-to-energy, and disposal related activities such as daily cover at landfills remain the dominant management practices even after over three decades of efforts to jump-start broader recycling applications.

Even prior to the current pandemic period, waste diversion programs in many parts of the country began losing ground.<sup>4</sup> The most recent data from US EPA<sup>5</sup> indicates the overall recycling and composting rate for municipal solid waste began stalling at 34-35% beginning in the period 2010 to 2017, and even after an upsurge in local composting programs backfilled ground lost as recycling dropped overall, fell to 32.1% in 2018.

California’s rates have followed the same trend.<sup>6</sup> After reaching a high of 50% in 2012 – 2014, California’s solid waste recycling rate (recycling, source reduction, composting) then declined steadily, reaching an estimated 40% in 2018 and 37% in 2019. The most recent report shows some recovery to 42% in 2020 as the estimated amounts applied to beneficial uses (e.g., daily cover) declined.<sup>7</sup> California still remains well below the goal of 75% recycling by 2020 established in AB 341 (Chapter 476, Statutes of 2011), and even below the original goal of 50% waste diversion (recycling plus beneficial uses) by 2000.

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<sup>2</sup> California Legislative Analysts’ Office, Fiscal Impact Estimate Report, A.G. File No. 19-0028, Amendment #1, December 24, 2019.

<sup>3</sup> Including Pennsylvania Act 101 of 1988 and Maryland Recycling Act of 1988.

<sup>4</sup> For example: American Recycling is Stalling, and the Big Blue Bin is One Reason Why, Washington Post, June 20, 2015; America Finally Admits Recycling Doesn’t Work, Foundation for Economic Education; March 21, 2019; Trashed: How California Recycling Failed and How to Fix It, Consumer Watchdog, January 2020; Opinion: Colorado’s Dismal Recycling Record Needs a Response and We Have a Plan, Denver Post, November 30, 2021.

<sup>5</sup> US EPA, National Overview: Facts and Figures on Materials, Wastes and Recycling, accessed December 29, 2021.

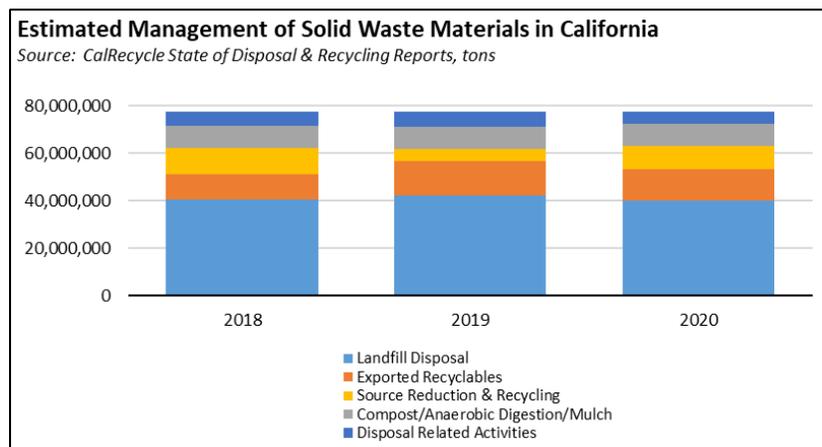
<sup>6</sup> CalRecycle, State of Disposal and Recycling for Calendar Year 2020, December 28, 2021.

<sup>7</sup> The amount falling under recycling/source reduction is calculated as a residual after all other management amounts have been estimated.

Some of this decline stems from initial successes in the various recycling efforts. The rapid rise in the amount of materials being recycled both in the state and elsewhere overwhelmed available markets and drove prices down. Efforts to make recycling as convenient as possible to households such as through single or at most three bins resulted in material contamination undercutting the quality of recycled materials coming from many programs, driving prices down even further and making portions of the recycled stream economically worthless.

With only limited domestic markets for these materials, local recycling programs have relied heavily on export markets for financial feasibility. This structure was disrupted by concerns especially emanating from China that they were being used as the dumping grounds for unwanted solid waste from the US and other developed economies. Once the leading export market for the local programs, China began placing restrictions on the quality of recycled materials they were willing to accept, including Operation Green Fence in 2013, a targeted one-month crackdown on plastics in 2015, and Operation National Sword that took effect at the beginning of 2018 banning imports of 24 categories of scrap materials. This action was followed by similar restrictions or ban on scrap plastic by other Asian nations including Malaysia, Vietnam, India, and Thailand. In essence, these restrictions produced some transparency in diversion rate estimates by California and nationally, no longer counting exported materials that technically were treated as “recycled” but often ended up shifted to disposal after being shipped overseas.

Exports, however, remain the primary destination for the state’s recycling programs. In 2020,<sup>8</sup> 40% of the estimated diversion tonnage was exported, 31% was counted under recycling and source reductions, and the remaining 29% was from composting. Overall, recycled materials (from California and other states) made up 23% of all exports through California ports in 2020 as measured by tonnage, and 5% measured by value.



In 2020, only an estimated 13 million tons (17% of total solid waste generation)—of which up to 9 million tons were from composting activities—went to end uses, defined as a consumer use (e.g., compost or wood chips) or use of the materials as an input to production, construction, fuel, or other use. Far from creating California jobs based on new recycled product businesses as envisioned in the original 1998 and subsequent recycling laws, this outcome remains a minor and largely unfulfilled aspect of the existing programs. Policy visions of a “circular economy” still rely

<sup>8</sup> CalRecycle, State of Disposal and Recycling for Calendar Year 2020, December 28, 2021.

extensively on side trips as recycled wastes are exported and at best a portion is re-imported as finished products.

### Single Use Plastic Packaging in the Waste Stream: National

Plastics have become an increasing regulatory focus over several years as nationally, overall recycling efforts stalled and then began to backtrack. Due to the number of different resins, limited collection and even more limited sorting capacity for certain resin types, plastics have been considered a more problematic material ever since the beginnings of the modern recycling efforts. Recycling rates overall for plastics remain below other materials when considered solely from the amount recycled. The same durability, protective, sanitary, clarity, cost, and weight features that make these materials preferable in consumer applications also leads to heightened concerns when they are released into the environment as litter, especially due to potential effects on marine ecosystems.

In the most recent national data from US EPA for 2018, the overall recycling rate for all plastics in municipal solid waste was 8.7% (24.4% if waste-to-energy is included). This rate, however, varies substantially by resin, as shown in the following table, with resins used in more easily sorted bottles and containers currently having some of the higher rates.

**Total Plastics in Products, US, 2018**

*Source: US EPA, Advancing Sustainable Materials Management: 2018 Tables and Figures*

Resin	Generation (thousand tons)	Recycled	Combusted with Energy Recovery
Other resins	4,160	26.7%	
PET	5,290	18.5%	
HDPE	6,300	8.9%	
LDPE/LLDPE	8,590	4.3%	
PS	2,260	0.9%	
PP	8,150	0.6%	
PVC	840	neg.	
PLA	90	neg.	
Total Plastics in MSW	35,680	8.7%	15.8%

The plastic applications targeted by the proposed initiative—plastics used in packaging and foodware—however, have a somewhat higher rate at 12.7% (27.7% including waste-to-energy) again due largely to extensive recycling of beverage and other rigid plastic containers. Because these numbers are based on MSW data, they incorporate both plastics (packaging and products) coming from domestic production along with plastics associated with the consumption and use of imported final goods and components.

As the result of various recycled content requirements in California and elsewhere for rigid containers combined with current individual company ESG programs, recycled plastics are some of the most valuable materials along with aluminum produced by local recycling programs, but the

**Plastics in Packaging & Foodware, US, 2018**

Source: US EPA, *Advancing Sustainable Materials Management: 2018 Tables and Figures*

Resin	Generation (thousand tons)	Recycled	Combusted with Energy Recovery
<b>Plastic Plates and Cups</b>			
LDPE/LLDPE	20		
PLA	30		
PP	160		
PS	820		
<i>Subtotal Plastic Plates and Cups</i>	1,030	neg.	19.4%
<b>Plastic Containers</b>			
Bottles and Jars: PET	3,130	29.1%	14.1%
Natural Bottles: HDPE	750	29.3%	13.3%
Other plastic containers			
HDPE	1,600	18.1%	
PVC	20	neg.	
LDPE/LLDPE	40	neg.	
PP	250	8.0%	
PS	80	neg.	
<i>Subtotal Other Plastic Containers</i>	1,990	15.6%	16.6%
<b>Bags, sacks and wraps</b>			
HDPE	640	7.8%	
PVC	70		
LDPE/LLDPE	2,780	13.3%	
PP	570		
PS	140		
<i>Subtotal Bags, Sacks and Wraps</i>	4,200	10.0%	17.6%
<b>Other Plastics Packaging</b>			
PET	730	9.6%	
HDPE	800	neg.	
PVC	300	neg.	
LDPE/LLDPE	910	neg.	
PLA	20	neg.	
PP	1,010	3.0%	
PS	330	6.1%	
Other resins	360	neg.	
<i>Subtotal Other Packaging</i>	4,460	2.7%	19.1%
<b>Total</b>			
PET	3,860	25.4%	
HDPE	3,790	14.8%	
PVC	390	neg.	
LDPE/LLDPE	3,750	9.9%	
PLA	50	neg.	
PP	1,990	2.5%	
PS	1,370	1.5%	
Other resins	360	neg.	
<i>Total Packaging &amp; Foodware Plastics in MSW</i>	15,560	12.7%	15.0%

value varies widely by resin.<sup>9</sup> Resin codes 2 (HDPE), 5 (LDPE), and 1 (PET) generally command the highest prices. Other resins typically have much smaller to no domestic markets other than as fuel for waste-to-energy conversion. Demand in particular for PET is rising as consumer product

<sup>9</sup> Recycling Isn't as Clear-Cut as You Might Think, Wall Street Journal, April 23, 2021.

companies adopt their own recycled material goals,<sup>10</sup> while overall markets for recycled and virgin materials are currently in flux as investors see future shortages in many commodity supplies as the result of current environmental policies and related litigation<sup>11</sup> combined with continuing uncertainty in supply conditions due to pandemic related factors. Although still limited, the introduction of bioplastics such as PLA and PHA into the recycling stream to date has not been so much an environmental opportunity as a source of potential contamination in otherwise marketable materials.

## Single Use Plastic Packaging in the Waste Stream: California

Comparable information showing existing plastics recycling rates is not available for California. Instead, the most relevant data comes from the most recent waste characterization study showing the amount of solid waste disposed in the state. The information, however, is not detailed enough to show the exact amounts subject to the proposed initiative, but is presented in broader categories that also include products that would not be affected by this measure.

In all, 11.5% of the 2018 disposed solid waste stream was composed of plastic materials, not counting items such as paper, glass, and other products containing plastic components. Categories containing plastic packaging and foodware subject to the measure—including paper packaging with plastic linings or other plastic components—account for 8.5% of the total. As a subset, foodware categories account for 2.1%. These totals assume plastic caps associated with glass and other non-plastic containers become separated and are instead included in the categories shown in the table below. Note that while the national numbers in the previous section cover the full MSW waste stream, the California numbers in the table below cover only the portion going to disposal facilities.

### MSW Categories Containing Materials Subject to the Initiative, California, 2018

*Source: CalRecycle, 2018 Facility-Based Characterization of Solid Waste in California*

MSW Category (tons)	Foodware	Total Plastic Packaging
PETE Beverage Containers - CRV		128,410
PETE Bottles and Jars – Non-CRV		58,855
PETE Containers, Lids, and other Packaging	113,793	113,793
HDPE Beverage Containers - CRV		7,374
HDPE Bottles and Jars - Non-CRV		158,020
HDPE Containers, Lids, and Other Packaging	25,748	25,748
Polypropylene Containers and Packaging		242,664
Other Plastic Containers and Packaging	136,479	136,479
Expanded Polystyrene Packaging	209,172	209,172
Non-Bag Commercial and Industrial Packaging Film		655,233
Flexible Plastic Pouches		22,059
Other Film		936,713
Miscellaneous Paper Packaging	352,975	352,975
Aseptic Containers		28,002
Gable-top Cartons		46,766
Remainder/Composite Paper - Other		213,067
Total Tonnage	838,167	3,335,330
Percent of Total MSW	2.1%	8.5%

<sup>10</sup> Empty Plastic Bottles Go from Trash to Hot Commodity, Wall Street Journal, November 9, 2021.

<sup>11</sup> Investors Bet Environmental Fears Will Crunch Commodity Supply, Lifting Prices, Wall Street Journal, September 23, 2021.

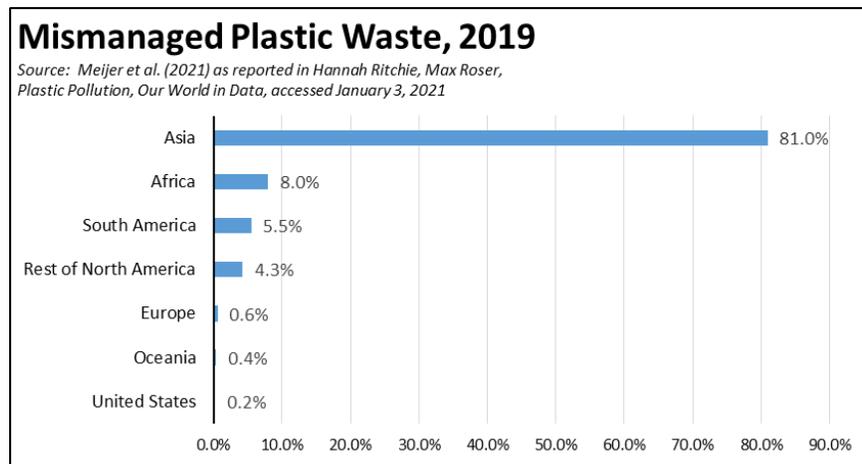
Again recognizing that the amounts shown cover substantial amounts of materials that would not be affected by the measure, using these numbers provides an upper bound estimate for what it can achieve. Disposal was the destination for 52% all of California’s solid waste in 2018 (and 2020). Using this factor:

- The plastic categories shown in the table above account for 2.7 million tons, or 69% of all plastic wastes disposed in 2018. Even with its substantial costs, the measure will address less than 2/3 of total plastic wastes in the state.
- Even assuming the 8.5% share as a high-end estimate of the disposed solid waste stream that would be brought under this measure, California’s recycling rate would at most improve by 4.4%. The 2019 rate would consequently have risen at most to 41%, and 2020 rate of 42% at most to 46%, both still well below the current goal of 75% by 2020 and even the original goal of 50% by 2000. However, because the table’s categories are far broader than what is covered by the measure, the actual increase would be smaller.

The estimated costs discussed later must be considered from this cost effectiveness factor—taxing and spending more to revive programs that have failed to meet their mandated goals, yet still doing little to reverse this trend.

## Plastics Pollution

Another policy driver for increased regulation of plastics has been growing concerns over the fate and effects of plastic that is littered, especially on the marine environment. Detailed data on the sources and amounts involved is limited, but several recent studies provide a basis to make some general estimates on the amounts that would be affected by the proposed measure.



The most recent compilation of information on the issue was prepared by the UN Environment Programme<sup>12</sup> and released as a prelude to the COP26 climate conference in Glasgow. To illustrate current uncertainty in the amounts released into the oceans each year, the report cites two recent

<sup>12</sup> United Nations Environment Programme, From Pollution to Solution, A Global Assessment of Marine Litter and Plastics Pollution, 2021.

modeling studies. The first estimates 10-15 million tons of plastic waste entering aquatic (including marine) ecosystems in 2016, rising to 25-41 million tons in 2040. The second estimates the 2016 amount at 21-25 million tons, rising to 58 million tons by 2030. Sources of marine plastic waste vary widely by year, including nets lost or wastes dumped directly at sea, mismanaged waste streams such as litter and illegal dumping and failures at landfills and wastewater systems particularly in low- and middle-income countries, annual run-off, and extreme events such as floods and storms that shift large amounts of accumulated terrestrial wastes.

The report does not provide data on the contribution from each source, but details on the terrestrial sources of the type that would be affected by the proposed initiative are provided in a recent study of plastic wastes discharged into the oceans from global riverine systems, the primary source for this pollution.<sup>13</sup> Based on modeling for over 100,000 rivers and streams calibrated through field observations, this study estimated total plastic waste discharges into the marine environment at 0.9-3.0 million tons in 2019. The source of this plastic pollution was heavily concentrated, with 81% originating in Asia, 8.0% from Africa, 5.5% from South America, and 0.2% from the US.

Allocating the US amount to California's share by population and adjusting for the portion of plastic products covered by the measure, global marine plastic pollution from terrestrial sources would be reduced by at most 0.02% if the measure was 100% effective. The actual marginal effect would be smaller due to the same factors discussed in the previous section. The actual effect would be far smaller still if compliance is achieved through greater use of recycled plastics and bioplastics, in which case only the composition of marine plastic wastes would change rather than the behavior and practices that currently lead to it.

Proponents of measures similar to this with similarly small global effects generally argue that the value instead lies in presenting a California model that can be adopted more widely and thereby have a much broader effect. In the case of recycling, however, the California model to date instead has been to raise the cost to consumers and businesses, and then ship the results off to developing countries for disposal. A more effective model instead is already in place—proper management of the solid waste streams and increased public awareness to combat littering and illegal dumping to attain the relatively lower levels of plastic marine emissions already present in the US and several other countries. The proposed initiative may have other outcomes, but a noticeable effect on marine plastic pollution is not likely to be among them.

Further evidence of this outcome is also provided in littering studies. Studies by Keep America Beautiful<sup>14</sup> estimated that plastics comprised 19.3% of observed litter on US roadways. Observation surveys tracking individuals and how they disposed of various items, however, indicated that items of the type covered by the measure tended to be improperly disposed (littered) only 2-5% of the time compared to 17% overall (9% if cigarette butts are eliminated from the sample).

## Plastics Recycling

The proposed initiative relies heavily on expansion of single-use plastics recycling to meet its various goals. Within the measure:

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<sup>13</sup> Meijer LJJ, van Emmerik T, van der Ent R, Schmidt C, Lebreton L. More Than 1000 Rivers Account for 80% of Global Riverine Plastic Emissions into the Ocean. *Science Advances*. April 30, 2021.

<sup>14</sup> Keep America Beautiful, *Litter in America, 2009 National Litter Research Findings and Recommendations*.

- By 2030, all single-use plastic packaging must be recyclable, reusable, refillable, or compostable by 2030. While all these terms are subject to later interpretation and definition by the department, increasing plastics recycling capacity in order to meet the recyclable designation—more plastics are capable of being recycled even if the recycling rate never reaches 100%—is likely to be the primary compliance response. This outcome is especially likely given the cost of the other three alternative criteria and given dedicated funding within the measure to expand current local recycling programs.
- Under both the department and local government allocations, the measure includes funding to expand local recycling programs and to attempt to create new markets for recycled plastic materials.
- The department has the option to reduce the new tax to less than the 1 cent base for plastic items that are recyclable but not made with bioplastics. Given the likely demands on these funds particularly in the short and medium terms, this factor is not considered in the cost analyses.
- The department is given the authority to require use of recycled content and renewable materials in specific applications. This authority is unlikely to be exercised in the short term given the enormity of actions required under the measure, and to date, given that such recycled content requirements have been restricted to actions by the Legislature. However, the department has acted in the past to expand its regulatory reach administratively, including a protracted and contentious 5-year long regulatory process to bring additional products under the Rigid Plastic Packaging Container program (discussed below), and this option is still a likely outcome in the longer term.
- The measure also includes various provisions intended to increase plastics recycling including authority to the department to mandate take-back programs and deposits and funding to increase recycling capacity. This provision takes these decisions out of the Legislature's purview, and gives the department open-ended authority to increase consumer costs further through higher taxes and other actions.

As discussed previously, plastics have come under increasing policy interest in large part due to their historically low recycling rates. In recent years, these rates have been increasing both in the aggregate and in an effective sense as—in contrast to the situation for other recycled materials—more of the recycled plastics have gone to domestic operations rather than shipped overseas. Recycling rates for some resins, however, continue to lag in large part due to the lack of collection and sorting capacity and consequently lack of achieving sufficient size and reliability of recycled streams essential to improving the economics for these products.

Looking solely at recycling, however, is a misleading metric when considered from the first two purposes listed under the intent section of the measure: (1) reduce plastic pollution in the marine and coastal environments and (2) reduce the amount of single-use plastic waste generated in the state. As discussed previously, the national data from US EPA indicates that only 76% of all plastics in municipal solid waste and 73% of the items subject to the measure currently (2018) are landfilled. While only an estimated 9%/13% are recycled, the remainder fulfills these two purposes through

combustion, primarily for waste-to-energy and process heat, and replaces fossil fuels that would otherwise be used for these purposes.

Incineration is already excluded from consideration in the state's recycling programs, and there have been only limited applications overall within the state for some time especially when compared to much broader uses in other states and other countries such as in Europe.<sup>15</sup> Consequently, this exclusion is not likely to have any significant effect on the measure's outcomes or costs immediately, although longer term options such as advanced recycling could be hindered and reduce progress on managing plastic wastes overall. The continued focus on recycling rates only, however, severely misleads by more than half the amount of plastic wastes that are already diverted from landfills and marine pollution.

Within the context of the measure, recycling will take on several forms, but primarily within the following categories:

- Materials are collected and recycled into the same general product. This approach is a dominant source of current recycling growth in particular higher-grade PET used in bottles and some HDPE used in containers. These applications historically have been driven by recycled content laws, but current market conditions where demand is outstripping supply for recycled PET have come more from companies pursuing content targets through their ESG policies.
- Materials are collected and recycled into other products. While the public more generally thinks of recycling in terms of the first category, most plastics currently not being recycled will more often fall under this use. In the most recent but dated results from the state's RPPC program (as discussed below), only 55% of covered containers demonstrated compliance through the recycled content option, returning recycled plastics to their original use. Especially for more problematic plastics and those with far lower historic recycling rates, progress on this aspect of the measure will instead require finding new uses and products for these materials. The measure will require that they be technically recyclable—as demonstrated by expansion of recycling capacity, take-back programs, and deposits. Economic recyclability will require development of new uses in many cases.
- Advanced recycling, or chemical recycling, breaks down plastics into their components and produces equivalent virgin plastic resins, industrial chemicals and products, and fuels. In contrast, the previous two approaches consist of mechanical recycling, under which the wastes are sorted, cleaned, heated, and then formed into resin pellets used to make new plastic products. The potential for mechanical recycling is limited by resin type, quality, and presence of adulterants such as colorings and other resins. Advanced recycling has the potential to overcome many of these limits especially for the more problematic resins and mixed plastic wastes. Similarly, this approach can also be used to overcome some current

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<sup>15</sup> California Energy Commission (California Biomass and Waste-To-Energy Statistics and Data, accessed December 28, 2021) lists a total of 87 operating biomass and waste-to-energy plants with total installed capacity of 1,259 MW in California. These plants produced 2.95% of the state's total in-state generation in 2020. Facilities include the Long Southeast Resource Recovery Facility (SERRF), with both front-end and back-end recycling to recover materials from the portion of the city's solid waste stream processed through this plant (City of Long Beach, SERRF, accessed January 2, 2022).

recycled content limitations especially in food packaging using sheets of recycled plastic bonded between two layers of FDA-approved virgin food-grade plastics before the packaging is formed.

The measure’s restrictions on combustion and fuel production as eligible for consideration as recycling may limit this option, just as current state and federal policies on recycling tend to treat this option as incineration rather than a normal manufacturing or remanufacturing process. Still, nationally there are several advanced recycling facilities announced or already operating in the US, with a combined capacity to divert and recycle 5.9 million tons of plastic wastes annually,<sup>16</sup> or more than twice as much as would be needed to handle California’s currently landfilled portion of plastics subject to this measure.

The total amounts of plastics recycled nationally peaked in 2016 at about 2.8 million tons before declining to relatively stable levels in 2017 through 2019 as recycling of bottles and films eased somewhat. In the most recent data,<sup>17</sup> 2.55 million tons of plastics were recycled in the US in 2019. Of this amount, 87.9% (2.24 million tons) of the total was reprocessed at US and Canadian facilities. In addition, another 54,000 tons of recycled PET and HDPE were imported by US reprocessors to help meet growing demand for these products. Total reprocessing capacity in the US was at least 2.95 million tons.

### Post-Consumer Plastic Recycling, US, 2019

Source: American Chemistry Council et al., 2019 U.S. Post-consumer Plastic Recycling Data Report

Resin/Product (thousand tons)	Resin Sales, US	Recovered for Recycling, US	Recycling Rate	Acquired by US/Canada Reprocessors	Reprocessing Capacity, US
PET Bottles	3,183	888	27.9%	96.1%	1,200
HDPE Bottles	1,613	499	30.9%	92.2%	650
PP & Other Bottles				92.2%	n/a
PP Bottles	94	15	15.9%		
Other Bottles		2			
Non-bottle Rigid Film		645		86.6%	600
PE Clear Film		209		66.3%	
PE Mixed Color Film		54		65.5%	
PE Agriculture Film		71		94.9%	
PE Retail & Bags		138		77.8%	
Other Film		18		7.9%	
Other Plastics (excluding foam)		9		4.9%	n/a
Total		2,547		87.9%	2,950

Details by resin and product shown in the table below indicate that the highest recycling amounts and rates are bottles and other containers where substantial collection systems exist and where the collected materials are more adaptable to mechanical recycling methods. Note that Other Plastics (excluding foam) is a new category first contained in the 2019 report. Also note that the numbers in the table below reflect domestic resin production and do not incorporate plastics associated with

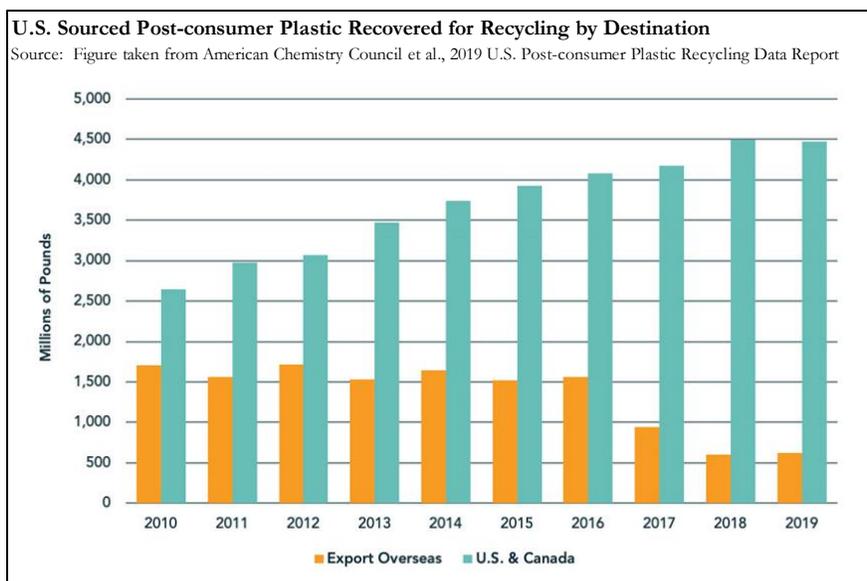
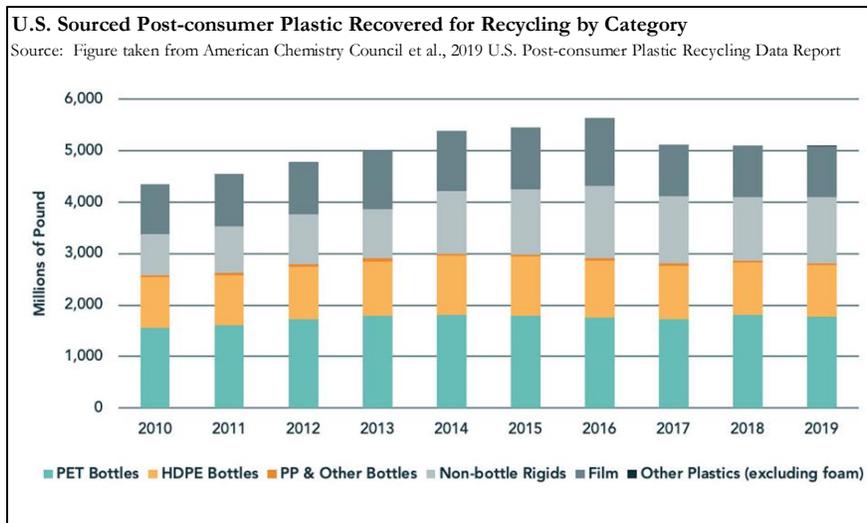
<sup>16</sup> American Chemistry Council, EPA Should Encourage, Not Discourage, The Acceleration of Advanced Recycling, press release, December 16, 2021.

<sup>17</sup> Plastics Division of the American Chemistry Council, Association of Plastic Recyclers, and Foundation for Plastic Recycling, 2019 U.S. Post-consumer Plastic Recycling Data Report.

imported goods and components as previously indicated in the national MSW numbers from US EPA.

The destination for recycled plastic streams has shifted more strongly. In 2010, about 40% of recycled plastics were exported overseas. In 2019, only 12.1% were exported, with the rest used at US and Canadian facilities. The relative incidence varies by resin, however, with the bulk of recycled PE Bags and Other Plastics still shipped to other countries where the economics of reprocessing these materials are more favorable.

Current use of the recycled materials varies by resin, with only a portion repurposed back into the original use. Recycled plastic markets consequently remain somewhat constrained by consumer demand for the products currently produced, while overall market demand and consequently prices instead are currently being driven by companies seeking higher quality resins to increase recycled content in their bottles and containers and other packaging.



As indicated in the 2019 data report, primary current uses of recycled plastics are:

- PET: Fiber including for carpets is the primary end use, followed by both food and non-food bottles, sheet and film, strapping, and other.
- HDPE: Natural HDPE bottles are recycled into new non-food bottles and pipe, followed by lawn and garden uses, plastic lumber, and automotive. Colored HDPE bottles are recycled into pipe, non-food bottles, land and garden uses, automotive, plastic lumber, and sheet and film. In 2018, about 37.4% of recycled materials went into non-food bottles, 33.2% into pipes, and the remainder into the other uses.<sup>18</sup>
- PP: Crates, buckets, pallets, automotive, and other injection molded items.
- Non-Bottle Rigid: Automotive products, crates, buckets, pallets, lawn and garden uses, railroad ties, and other relatively thick-walled injection molded products
- Film: Plastic lumber, sheet and film, and injection molding including pallets, crates, and buckets

The applicability of the recycling option, however, will depend on how the department chooses to define the term. The US Federal Trade Commission requires that at least 60% of consumers have access to recycling for a material in order for it to be labeled as “recyclable.” Under this version, about 65% of current plastic products already qualify, with the primary exceptions being other flexible materials especially multi-layer, tubes, PVC blisters, lids and clamshells, and PS and PVC containers.<sup>19</sup>

In their final regulations for the SB 1335 restrictions,<sup>20</sup> CalRecycle adopted the 60% standard but then added other factors as well under two compliance options:

- Sufficient commercial value to be marketed for recycling, and sorted and aggregated into defined streams by at least 60% of large volume transfer/processing facilities in the state.
- Sufficient commercial value, and included in a takeback program that recovers at least 60% of the affected products and that have sufficient commercial value.
- Beginning in 2026, the standards rise to 75%.

This latest definition is likely to be the starting point for consideration in implementing the measure, with any final outcome likely to create additional costs for products sold in California due to labeling conflicts with the current FTC requirements.

Costs of recycling are based on separate estimates for curbside and commercial recycling:

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<sup>18</sup> Association of Plastic Recyclers, 2018 United States National Postconsumer Plastic Bottle Recycling Report, 2019.

<sup>19</sup> McKinsey & Company, Accelerating Plastic Recovery in the United States, December 2019.

<sup>20</sup> CalRecycle, Final Approved Regulations, Sustainable Packaging for the State of California Act of 2018.

- Based on a survey of local rates, the average cost nationally in 2019 for curbside recycling at single family residences was \$350 to \$490 a ton, with a mid-point estimate of \$420.<sup>21</sup>
- Commercial costs are taken from a 2011 CalRecycle study<sup>22</sup> assessing recycling expansion potential. In 2008 dollars, the incremental cost per ton of expanding coverage of traditional recyclables was estimated at \$110 a ton. Adjusting to 2019 results in an estimate of \$140 a ton. This number assumes a very high revenue stream equal to 60% of total costs coming from the sale of commodities. CalRecycle average monthly scrap value numbers,<sup>23</sup> however, indicate that PET and HDPE scrap values have more than doubled in this period, offset by scrap values for other resins that remain at zero to minimal levels. Given the uncertainties over the future direction of recycled plastic prices and this factor, no adjustments are made to the net cost figures.
- In both cases, the estimates are based on current recycling streams. Expansion to cover more plastics is likely to be higher given that these materials generally take up substantially higher volume per ton. For the purposes of this study, no adjustments are made for this factor in order to maintain a conservative approach to the cost estimates.
- From the 2018 Waste Characterization Study, commercial disposed waste made up 49% of the plastic packaging categories subject to the measure. From this factor, the weighted average of the two rates is \$250 to \$320 per ton, with a mid-point estimate of \$280.

## Plastics from Renewables

The third priority of the initiative under its Purpose and Intent is to: *Reduce our reliance on fossil fuels and move towards renewable materials, including biobased products.* Additional priorities listed in this section include increasing the use of renewable materials in the products affected by the measure. Actions on these priorities include: (1) giving the department the authority to require the use of renewable materials for single use packaging and foodware, (2) reducing the tax to a maximum of 0.5 cent for items made wholly from plastic derived from renewable materials and 0.75 cent for items partially made from renewables, and (3) including compostable as one of the product attributes the affected items must meet by 2030.

Within the full product universe, a substantial amount of single use packaging is already produced with renewable materials, primarily paper including paperboard, cardboard, paper fill, and molded pulp. Within foodware, other molded pulp items are marketed as biodegradable or compostable, including bagasse, wheat straw, and other source materials. Some of these, however, will still be subject to the measure due to the use of PE or bioplastic coatings particularly for foodware but also some other single use packaging applications.

For plastics, the primary materials meeting these provisions will be bioplastics. That term as applied to different products covers items that would and would not be in compliance with the measure:

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<sup>21</sup> The Recycling Partnership, 2020 State of Curbside Recycling Report, February 13, 2020.

<sup>22</sup> HF&H Consultants and Cascadia Consulting Group, Cost Study on Commercial Recycling, January 2011.

<sup>23</sup> CalRecycle, Statewide Average Monthly Scrap Value Notice, accessed January 12, 2022 and through the Internet Archive.

- Degradable plastics are traditional resins containing additives that speed physical degradation in the proper light, heat, and moisture conditions. The plastic particles themselves are not chemically affected and do not biodegrade.
- Biodegradable or compostable plastics are generally but not always made from plant-based materials. These materials are technically compostable, but because they have been engineered to withstand specified heat and moisture conditions when stored or in use, are compostable only in industrial facilities of which there are only a limited number capable of doing so within the state.

Biodegradable plastics in particular are technically recyclable but not economically so due to their low penetration into the market that limits economic collection and to the challenges of separating these materials in sorting operations. The inadvertent introduction into other plastic recycling streams also is a contamination risk that can undermine otherwise marketable materials.

The term bioplastics also has come to be applied to an increasing number of material types:

- Materials such as PBAT (13.5% of global bioplastics production in 2020<sup>24</sup>) are biodegradable but are made with fossil fuels.
- Biobased PA (11.9%), PE (10.5%), PTT (9.2%), PET (7.8%), and other resins are made from renewable materials, but because they are produced to conform to conventional resins are not biodegradable.
- Biodegradable materials made from renewable materials primarily are PLA (18.7%), starch blends (18.7%), PBS (4.1%), and PHA (1.7%).

Overall, bioplastics capable of compliance with the measure were 42.6% of global bioplastics production in 2020. European Bioplastics expects total global production of the compliant materials to grow from about 1.0 million tons in 2020—with about half that amount used in rigid and flexible packaging—to about 3.3 million tons in 2026, with the primary growth in PHA and PLA. In total, all bioplastics are expected to reach only 2% of global plastics production in 2026.

Bioplastics production is highly concentrated, with half produced in Asia in 2021, growing to 70.8% in 2026. Only 16.5% was produced in North America in 2021, dropping to 8.5% by 2026. These numbers cover all bioplastics, with no breakdown on the location of compliant bioplastic production. The consequent outcome from requiring greater use of these materials, however, is not to expand domestic jobs, but instead increase reliance on imports from countries where they can be produced at lower cost.

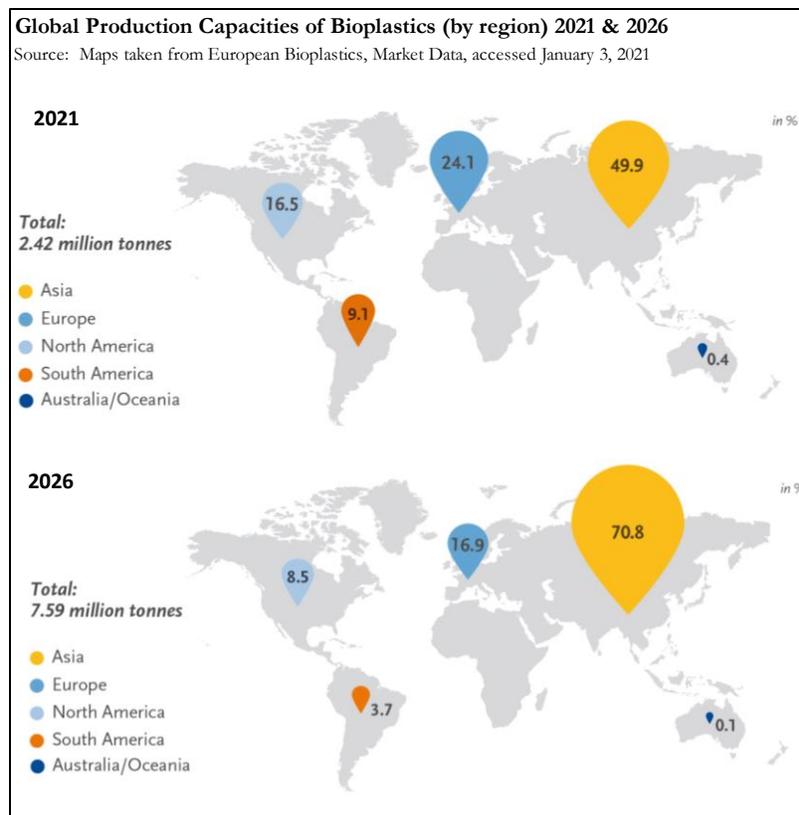
As a current example, World Centric is an often-cited example of a California compostable foodware products producer. However, the company produces only a portion of its PLA lids in the US, and manufactures the bulk of its offerings in Asia specifically to “*provide an affordable alternative to*

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<sup>24</sup> European Bioplastics, Bioplastics Market Development Update 2021.

*plastic.*<sup>25</sup> The higher costs of producing these products means many are produced overseas in order to come near to competitive pricing especially through lower labor costs.

Even with this geographic distribution, bioplastics remain more costly than the plastic applications the measure would replace. Costs have come down to some extent as production has increased especially in lower operating cost locations, but not to the extent often claimed for measures of this type that costs will be equalized over time due to economies of scale. For example, the difference between the cost paid by California Department of General Services for an 8 oz. PLA-lined paper hot cup compared to an 8 oz. expanded polystyrene foam cup was 9.0 cents in 2005. In the most recent pricing for the same products from the same sources (contract #1-17-73-02A, Supplement 7), the difference only fell to 6.8 cents after 17 years. This difference still does not reflect the additional cost of a paper sleeve often required to use a paper/PLA cup, but it is all that has been achieved after nearly two decades of attempting to stimulate bioplastics demand through regulation such as product bans/restrictions adopted by several coastal local governments (see below) plus comparable efforts in other countries such as in the EU. Costs have moderated slightly, but substantial cost differences still remain. Claims of equalization instead rely heavily on: (1) there are economies of sufficient scale to be unlocked and (2) all other technology stands still while the competition seeks to move up.



<sup>25</sup> World Centric, Customer Support FAQs, accessed January 10, 2022.

A shift to bioplastics will do little to reduce marine effects absent broader litter abatement and education efforts that would apply equally to both current and bioplastic sources. As recently stated by the UN Environment Programme:<sup>26</sup>

*The persistence of bio-based and biodegradable plastics in aquatic habitats is uncertain, but for some time experiments have found that even after three years the majority of biodegradable plastics and blends failed to show any degradation in the marine environment or to meet International Organization for Standardization (ISO) and ASTM biodegradation standards (O’Brine and Thompson 2010; Alvarez-Zeferino et al. 2015; Narancic et al. 2018; UNEP 2018a; Napper and Thompson 2019). . . There is evidence that, as litter, biodegradable plastics pose the same risks as conventional plastics to individuals, biodiversity and ecosystem functioning.*

A greater shift to bioplastics also carries the potential to exacerbate other types of marine impacts. In the US, PLA is currently produced primarily from corn starch, although companies such as Natureworks are exploring alternative feedstock sources as well. Expanded use of compostable bioplastics from this material would be associated with increased fertilizer use and nitrogen runoff that is one of the anthropogenic contributors<sup>27</sup> to marine dead zones,<sup>28</sup> which in the US are found particularly in the Gulf of Mexico but also along the Pacific Coast and Eastern Seaboard.<sup>29</sup> Bioplastics by virtue of coming from renewable resources do not guarantee elimination of current impacts coming from existing plastics use. They instead come with impacts and costs of a different nature, as is often the case with major changes such as is being proposed in this measure.

Another cost associated with bioplastics—although not quantified in this report—relates to continued regulatory proposals to shift food crops to industrial uses. After expanding biofuel mandates in the US after 2007 and in EU beginning in 2003, prices on many core food feedstocks (e.g., corn, casava, agave) rose sharply, leading to food riots in some developing nations.<sup>30,31,32,33</sup> European Bioplastics has estimated<sup>34</sup> that the total land area required to support their 2026 projection is 7.2 million acres, or only 0.058% of global pasture and arable land (0.17% of arable land). Another way to put this amount in context to consider the potential effects, however, is that it is equivalent to 75% of total California cropland in 2017<sup>35</sup> that would have to be shifted just to meet 2% of global plastics demand.

While the immediate effects consequently are likely to be small when considered on a global scale, the stated intent of the measure—as with similar measures in the EU and elsewhere—is to serve as a model pushing adoption of renewables in packaging well beyond the current projections for 2026. More importantly, these changes would come at a time of rising food prices overall, exacerbated by

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<sup>26</sup> United Nations Environment Programme, From Pollution to Solution, A Global Assessment of Marine Litter and Plastics Pollution, 2021, p. 31.

<sup>27</sup> Friends of the Earth blog, Ethanol Greenwash: Not Clean, Not Green, accessed January 3, 2021.

<sup>28</sup> National Ocean Service, What is a Dead Zone?, accessed January 3, 2021.

<sup>29</sup> Chesapeake Bay Foundation, Biofuels and Water Quality, Meeting the Challenge & Protecting the Environment, April 2007.

<sup>30</sup> Runge, C. Ford and Benjamin Senauer, “How Biofuels Could Starve the Poor,” Foreign Affairs, May/June 2007.

<sup>31</sup> Biofuel Mania Ends the Days of Cheap Food, South China Morning Post, July 20, 2007.

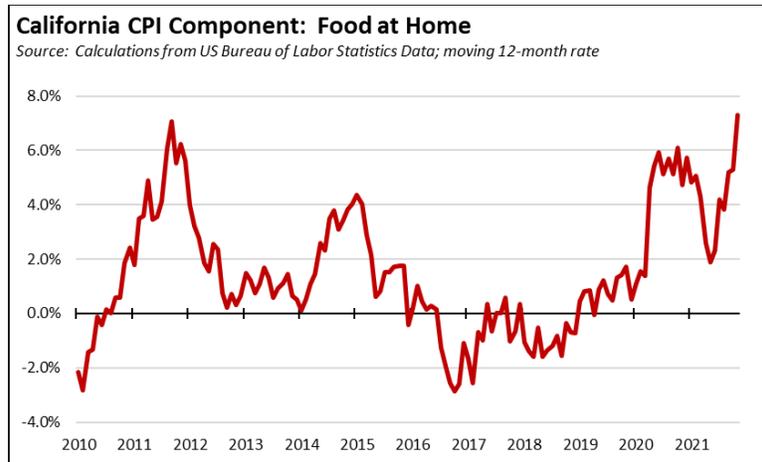
<sup>32</sup> Thousands in Mexico City Protest Rising Food Prices, New York Times, February 1, 2007.

<sup>33</sup> UN Expert Calls Using Food Crops for Fuel “Crime Against Humanity,” Associated Press Worldstream, October 27, 2007.

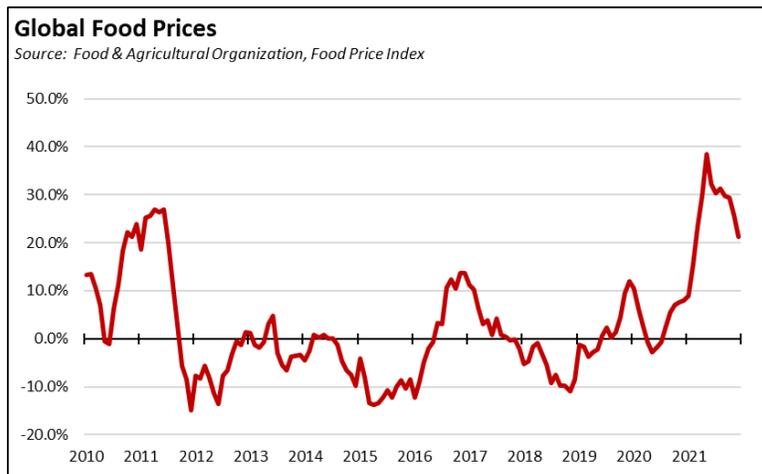
<sup>34</sup> European Bioplastics, Bioplastics Market Development Update 2021.

<sup>35</sup> US Department of Agriculture, Census of Agriculture, 2017.

current supply conditions stemming from the pandemic-related disruptions.<sup>36</sup> Taking the same formula used by Department of Finance to calculate the California CPI and applying it to the CPI components, costs of food at home (e.g., groceries) have been rising sharply after a period of relative stability, reaching 7.3% on an annual basis in the latest data for November 2021. Individual components such as meats and eggs are set to rise even faster due to California-only regulations.<sup>37</sup>



Globally, food prices have risen even more sharply,<sup>38</sup> reaching a 10-year high for 2021.



And even in situations where demand for additional renewable feedstocks do not result in outright crop substitution, the results will then generally be to covert woodlands and tropical forest into croplands. The threat of this outcome already is leading some environmental and community organizations to oppose proposed projects for expanded biofuels production.<sup>39</sup>

While bioplastics are technically compostable, currently there are relatively few facilities in the state

<sup>36</sup> US Grocery Shortages Deepen as Pandemic Dries Supplies, Reuters, January 14, 2022.

<sup>37</sup> ABC News, Bacon May Disappear in California as Pig Rules Take Effect, July 31, 2021.

<sup>38</sup> Food Prices Soar, Compounding Woes of World's Poor, Wall Street Journal, May 20, 2021.

<sup>39</sup> These Bay Area Refineries Want to Ditch Crude Oil for Biofuels. Critics Say That's a Bad Idea, San Francisco Chronicle, December 21, 2021.

willing to accept these materials. In their comments on the draft regulations banning plastics use that is not reusable, recyclable, or compostable, by food vendors on state properties pursuant to SB 1335 (2018), the state's composting industry association, California Compost Coalition, indicated:<sup>40</sup>

*Packaging and products made from compostable materials are not welcome at a majority of compost manufacturing facilities, especially those products which are not directly associated with food scrap recovery. Likewise, compostable plastics frequently are a contamination problem for recycling facility operators and remanufacturers.*

The Coalition's letter further stated that their 2019 survey showed only 14 of 38 (37%) permitted mixed materials composting facilities in the state were willing to accept compostable packaging.

Costs of expanding composting capacity in the state were estimated by CalRecycle in 2018<sup>41</sup> under their standardized regulatory impact assessment (SRIA) for proposed regulations to impose composting mandates for organic wastes under SB 1383 (Chapter 385, Statutes of 2016). Updating these estimates to 2019 dollars and adjusting the amounts to net out the portion for edible food recovery, costs for further expansion to handle each additional million tons of compostable materials from plastics would be about \$240 million for capital costs and \$170 million annually for operating and administrative costs.

These numbers incorporate savings from no longer landfilling the covered materials along with revenues from selling the resulting compost. However, given the state's current major expansion of composting mandates, prices are likely to decrease, and any produced compost is likely to be used for purposes other than sale at least through the medium term. This factor, however, is retained in the estimate.

The numbers also are not adjusted to account for the nature of these materials. The CalRecycle numbers are based on more easily handled organic materials, rather than packaging materials that currently are not accepted at the majority of existing industrial composting facilities. The subject materials also have significantly higher volume per ton. While the CalRecycle numbers are used as the best and most recent available for California, they likely are an underestimate for these reasons.

## Plastics Regulation

**Local Restrictions on Foodware.** Beginning with Berkeley in 1988, a number of local governments and states have considered restrictions and outright bans on the use of various food service products, with most involving a limit or ban on expanded polystyrene foam products. Of the measures adopted to date, just over three-quarters have been in California, adopted primarily by coastal and Bay Area local governments, but these vary widely in their provisions, ranging from restrictions just on local government purchases, to limits on the types of takeout food containers food vendors may use, to broader prohibitions on individual consumer purchases as well.

While these restrictions have been adopted, there have been no studies to assess their effectiveness, including whether they have produced an overall decrease in litter or waste or even if they have achieved full compliance within the affected jurisdictions. Further, no study has been done

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<sup>40</sup> California Compost Coalition, comment letter dated May 21, 2020.

<sup>41</sup> CalRecycle, Proposed Regulation for Short-Lived Climate Pollutants: Organic Waste Methane Emissions, Standardized Regulatory Impact Assessment (SRIA), November 2018.

analyzing which material types have been chosen as replacements, their actual costs, or subsequent environmental consequences coming from their disposal and litter.

**State Proposals on Foodware.** Various restrictions on plastic disposable food service packaging have been considered by the California Legislature in the past. With only two exceptions applying to limited situations, none have passed. Some of the more recent efforts include:

- AB 1659 (2018) originally proposed creation of an extended producer responsibility program for plastic food service packaging. Amended to another subject.
- AB 1884 (Chapter 576, Statutes of 2018) prohibits full-service restaurants as of 2019 from providing a single use plastic straw to customers unless requested. This measure does not apply to take-out food and other types of food vendors. Chaptered and regulations issued.
- SB 705 (2018) proposed banning use of expanded polystyrene foam food containers by all food vendors by 2022. Failed on Senate Floor.
- SB 1335 (Chapter 610, Statutes of 2018) prohibits food service facilities operating as a concessionaire or under contract to a state agency or located on state property from using food service packaging unless it is on a list of approved packaging that is reusable, recyclable, or compostable. Chaptered and regulations issued by CalRecycle.
- AB 2921 (2017) proposed creation of an extended producer responsibility program for expanded polystyrene foam food service packaging. Failed in its first committee.
- SB 705 (2017) proposed banning use of expanded polystyrene foam food containers by all food vendors by 2022. Failed on Senate Floor.
- SB 529 (2013) proposed requiring fast food facilities to use only recyclable or compostable disposable foodservice packaging, with allowable products limited only to those meeting increasingly strict recycling/composting targets. Failed in Senate Appropriations.
- SB 568 (2011) proposed restricting food vendors from dispensing prepared food in a polystyrene foam food container. Failed on Assembly Floor.
- AB 2138 (2010) proposed restricting food providers to using only recyclable or compostable disposable foodservice packaging, with allowable products limited only to those meeting a 25% composting/recycling rate. Failed in Assembly Appropriations.
- AB 1358 (2009) proposed restricting food vendors from dispensing prepared food in polystyrene, nonrecyclable plastic, or nonrecycled content paper containers, and allowed use of compostable plastic containers only in jurisdictions with curbside collection for composting. Amended on Assembly Floor to another subject.
- AB 904 (2008) proposed restricting takeout food providers from using only foodservice packaging that is compostable or recyclable. Failed in Senate Appropriations.

The current legislative sessions similarly had several new proposals related to the same issues, but largely tracked measures contained in the Preliminary Recommendations Report from the Statewide Commission on Recycling Markets and Curbside Recycling (CalRecycle, December 2020). The proposed initiative incorporates many of those provisions along with others from the report.

**Recycled Plastic Content.** As part of its efforts to create markets for recycled materials, California has enacted recycled content requirements for some products, including glass containers, fiberglass insulation, and newspaper. Minimum content standards have been set by the Legislature for 3 plastic product types.

Recycled-Content Trash Bag Program allows manufacturers to certify compliance through one of three options:

- In aggregate, plastic trash bags sold in California contain at least 10% actual postconsumer material by weight.
- In aggregate, 30% of all plastic products intended for sale in California is actual postconsumer material.
- Bags are exempt (below minimum gauge, non-plastic trash bags, hazardous or medical waste bags).

Rigid Plastic Packaging Container (RPPC) Act of 1991 (SB 235, Chapter 769, Statutes of 1991) requires specified plastic containers to meet base recycling content requirements. The point of compliance is with the product manufacturer using the container rather than the container producers. Compliance as expanded over the years can be shown in one of several ways:

- Use 25% recycled content (postconsumer recycled content).
- Use source reduction reducing RPPC weight by 10%, product within the RPPC is concentrated by at least 10%, a combination of the two, or the RPPC weighs 10% less when compared to a similar competitor product.
- RPPC is routinely reused at least 5 times.
- RPPC is routinely refilled at least 5 times.
- A specified type of RPPC has attained at least a 45% recycled rate.
- RPPC contains floral preservatives and is subsequently reused by the floral industry for at least two years.
- The company including all its subsidiaries use California recycled material in amount equal to or greater than the amount required under the 25% standard.

In the last annual report on the program,<sup>42</sup> 55% of RPPCs sold in 2005 relied on the first compliance method, source reduction by 40%, and only 5% relied on the reusable/refillable options.

The RPPC law and regulations have been revised several times, including notably in 2013 after a 5-year long contentious rulemaking process when the department administratively extended the requirements to another 350 million containers that previously were exempt from the program.

In a report prepared under contract for the department, the RPPC program previously was criticized as complex, costly, and largely ineffective in furthering the state’s recycling goals:

*The RPPC Act provides an ineffective and fragmented approach to dealing with only a small portion of California’s plastic waste stream. Small firms, or those selling only a few RPPCs into California, often have a difficult time meeting requirements of this law. Larger companies tend to be in compliance with the law, but they generally claim that it stifles packaging innovation, especially source reduction. Plastics source reduction under the law is difficult to measure and establish a baseline, and it is hard to verify source reduction within an RPPC.*

*The cost to the CIWMB for implementing and administering the RPPC Act is high. . . The costs to industry to effectively comply with the RPPC Act and document compliance are high . . . The State of California is spending significant government and industry time and money to administer and comply with the RPPC Act. This law has produced little environmental improvements for plastics, and the law has not made any significant impact on plastics recycling rates, or markets, in the state.<sup>43</sup>*

While the 2013 regulations in part were an effort to address these shortcomings, these changes did little to reduce the administrative burden on both the state and regulated entities. As reflected by the state’s recycling rate going the wrong direction in recent years, these amendments also did little to move the state closer to its goals. Yet, the proposed initiative draws heavily on this program’s components and seeks to apply them more broadly to billions of more products.

Beverage Containers have more specifically been covered by increased content amounts recently adopted by the Legislature. AB 2530 (Chapter 861, Statutes of 2016) required beverage container manufacturers to report the amount of recycled content in their products. This provision was extended to content requirement under AB 793 (Chapter 115, Statutes of 2020), which requires specified beverage containers to be 15% recycled content by 2022, 25% by 2025, and 50% by 2030. Producers not meeting these levels will be required to pay 20 cents for each pound of postconsumer recycled resin short of the target, with monies going to recycling, collection, and processing of plastic bottles.

## Existing Waste Diversion Programs

**Cost of State Programs.** The total budget for the state’s current recycling and other solid waste programs dropped from \$2.1 billion in 2020-21 to a proposed \$1.6 billion in 2022-24, caused in part by a reduction in fee revenue. The department’s total budget has been much higher in recent years, but as the result of funds appropriated to handle cleanup and waste from major fires and other emergencies. These are netted out in the table below to indicate the department’s budget for its recycling and solid waste responsibilities alone. In light of record budget surpluses in both 2021-22

<sup>42</sup> CalRecycle, Final Statement of Reasons: Rigid Plastic Packaging Container Program, 2012.

<sup>43</sup> Integrated Waste Management Board (CalRecycle predecessor), Plastics White Paper, Optimizing Plastics Use, Recycling, and Disposal in California, May 2003.

and now projected at \$45.7 billion (\$20.6 billion discretionary general fund) in the 2022-23 Proposed Budget, the downward trend in the budget numbers indicate programs of the type contained in the measure remain a lower priority for the state.

**CalRecycle Expenditures (\$ million)**

*Source: Department of Finance Budget Documents*

	2018-19	2019-20	2020-21	2021-22	2022-23
Total Expenditures	\$3,594	\$2,176	\$3,794	\$2,149	\$1,640
Wildfire/Emergencies	2,017	531	1,687	304	0
Net Program Expenditures	\$1,578	\$1,646	\$2,108	\$1,846	\$1,640

Specific to plastic waste and the market expansion envisioned in the measure, the department previously received \$10 million in 2020-21 and in 2021-22 for plastic market development pursuant to AB 148 (Chapter 115, Statutes of 2021). The 2021 Budget Act included \$270 million over two years for proposed Circular Economy activities across several agencies for plastics and other materials. The recent Proposed Budget contains no proposals to extend either program despite an additional \$20.6 billion in discretionary funds that could be used to do so.

During budget downturns, the recycling programs have been used as a source of funds to shift to other spending priorities. When given a choice after taxpayers have provided the state with substantial surplus funds, the spending contained in the measure ranks low if at all in the final list.

**California Recycling/Source Reduction Taxes & Fees (\$ million)**

*Source: Department of Finance Budget Documents*

Product	Tax & Fee Revenue				Ending Fund Balance			
	2019-2020	2020-21	2021-22	2022-23	2019-2020	2020-21	2021-22	2022-23
Beverage Bottles & Containers	\$1,352.9	\$1,491.6	\$1,266.3	\$1,266.3	\$367.2	\$614.1	\$521.5	\$459.9
Electronics	92.8	61.2	64.8	64.8	140.3	92.8	64.1	57.0
Solid Waste Tipping Fee	53.0	63.3	67.3	62.8	25.6	29.5	31.7	27.8
Tires	58.4	60.0	59.9	61.6	77.7	69.0	65.1	63.6
Lead-acid Batteries	15.0	20.0	27.6	39.6	14.2	20.9	33.6	59.1
Motor Oil	22.4	22.5	21.7	19.6	13.8	23.2	21.2	17.1
Carpets	0.4	0.4	0.4	0.4	0.7	0.5	0.2	-0.1
Paint	0.3	0.4	0.3	0.3	0.4	0.6	0.4	0.2
Total, State Agencies	\$1,595.1	\$1,719.2	\$1,508.2	\$1,515.4	\$639.8	\$850.6	\$737.8	\$684.6
Energy (Greenhouse Gas Fund)	2,105.8	2,623.7	3,560.0	2,297.0	3,061.6	3,219.8	669.7	200.8
Mattresses	43.8	50.0	47.3	48.5	34.1	30.0	28.0	25.5
Total, All Taxes & Fees	\$3,744.7	\$4,392.8	\$5,115.5	\$3,860.9	\$3,735.5	\$4,100.3	\$1,435.4	\$910.9

Supporting the department's expenditures are an ever-expanding set of existing taxes and fees on various products, intended as in the case of the proposed initiative to support material-specific recycling, promote related market development, incentivize source reduction, and in many cases generate additional surplus funds that historically have been used for non-diversion purposes and by other agencies.

In the table above, the individual components primarily go to CalRecycle with the following exceptions:

- Battery fees consist of \$1 per battery imposed on the consumer/purchaser and another \$1 on the manufacturer. Funds are allocated to Department of Toxic Substances Control.
- Greenhouse Gas Reduction Fund (Cap & Trade auction proceeds) is included in the table because this tax is designed to act in a manner similar to the tax proposed in the measure. The tax is applied to existing energy and other fossil fuel uses that state policy has determined should be reduced, and applied to various programs intended to reduce that use and encourage use of alternatives, along with substantial amounts going to tangentially related programs such as High Speed Rail with little to a counter effect on greenhouse gas reductions in the state.
- Mattresses also are treated separately in the table. The state imposes a recycling fee on each new mattress sold, which is collected and then transferred to a non-profit industry group that runs the recycling program. CalRecycle approves the annual budget, including administrative funds to the department, along with the annual fee level.<sup>44</sup>
- While the beverage bottle and container fee was originally constructed as a refundable deposit, it increasingly has functioned as a tax. The overall redemption rate has steadily declined, from at least 74% in 2013 to 62% in 2020.<sup>45</sup> The portion being returned to the original consumer is even lower, with funds paid instead to trash haulers and individual bottle collectors.

These programs historically have carried large amounts of reserves, which have been used in the past for a variety of purposes including to backfill shortages elsewhere in the state budget both as loans and as direct appropriations. The projected balance has been declining, but still accounts for nearly a billion or more of related taxes and fees charged directly and indirectly on Californians and not used for their intended purpose.

The taxes and fees shown above also are not the only current state charge on the affected products. Notably, consumers and businesses also pay sales tax, which currently ranges from 7.25% to 10.75%<sup>46</sup> and an average of 8.68%.<sup>47</sup> This tax will apply to most final sales of the products subject to the measure, with the exception (but not in all cases) of food (not heated) generally sold for preparation at home. Additional state fees and taxes are charged on a wide range of other products for other than recycling purposes, many of which will contain plastic packaging and be subject to the measure.

**Cost of Local Programs.** Beyond the state tax and fee amounts shown above, businesses and households also pay to support local recycling programs through their monthly collection fees. Data on the total paid annually is not available but can be estimated through two approaches:

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<sup>44</sup> Mattress Recycling Council, California Used Mattress Recovery and Recycling 2022 Program Budget, July 1, 2021.

<sup>45</sup> Container Recycling Institute, Redemption Rates and Other Features of 10 U.S. State Deposit Programs, 2021.

<sup>46</sup> California Department of Tax and Fee Administration, California City & County Sales & Use Tax Rates (effective January 1, 2022), accessed January 14, 2022.

<sup>47</sup> Tax Foundation, Facts and Figures 2021: How Does Your State Compare?, March 10, 2021.

- Applying the average 2019 recycling cost per ton calculated previously (see Plastics Recycling) to the waste stream numbers from CalRecycle (Recycling Programs Performance to Date) results in an additional estimated \$4 to \$5 billion annually spent on local recycling programs, both those operated directly by local agencies and those operated through franchise agreements. Of this amount, about \$1.2 billion was paid directly by businesses (and indirectly by households) and the other \$3 to \$4 billion was paid by residences, or an average of \$230 to \$320 a year per household.
- Alternatively, estimating the total instead from a sampling of local charges for recycling/compost collection applied to the number of households in the state results in a comparable figure of \$3.4 to \$4.6 billion in 2019.
- Combining these two approaches, about \$4 billion overall is already being paid annually by households and business in the state to increase recycling and otherwise reduce solid waste, including plastics, within the state.

These costs, however, vary widely across the state. As examples, current single family home rates for all trash collection using comparable bin sizes are \$43.04 a month (\$516 annually) in San Francisco<sup>48</sup> and \$51.35 (\$616) in San Jose,<sup>49</sup> compared to \$36.32 (\$436) in Los Angeles<sup>50</sup> and \$25.37 (\$304) in Fresno.<sup>51</sup> Using the detailed breakdowns available for the first two cities by bin type, about 2/3 of the monthly rate currently goes to supporting recycling and composting.

**Current Base Costs.** Combining both the state (FY 2019-2020) and local (CY 2019) numbers above, California businesses and households paid about \$5.6 billion for existing waste diversion programs (recycling, reuse, and source reduction) in 2019 if the greenhouse gas funds are not included, and \$7.7 billion if these taxes are included.

A key point, however, is that these costs were based on state and local programs that already were sized presumably to achieve the two state goals of 50% waste diversion by 2000 and 75% by 2020. In 2019, the state diversion rate was only 37%. As discussed previously, fully effective implementation of the provisions in the measure would have at most taken this figure to 41%, and likely much lower given that the waste categories to calculate this increment cover more than the wastes covered by the measure.

In other words, households and businesses based on the 2019 numbers are already paying for programs that should be capable of achieving 75% diversion but are instead only producing results that are half as much. Even if the lower 50% standard was considered as total program capacity, there still was and still is ample capacity to handle wastes in the amounts that would be affected by the measure.

Households and businesses are already paying for 75% diversion. The measure in essence would charge them again for the same services, and then still only allocate about 30% of the tax proceeds

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<sup>48</sup> Recology, San Francisco 2021 Refuse Rates, accessed January 14, 2022.

<sup>49</sup> City of San Jose, Rates & Billings, accessed January 14, 2022.

<sup>50</sup> City of Los Angeles, Los Angeles Sanitation, LASAN Billing, accessed January 14, 2022.

<sup>51</sup> City of Fresno, Master Fee Schedule, May 2021.

to cover plastics. Plastics may present more challenges in some instances, but the current taxes and fees are already producing surpluses that could be applied to these issues.

In some instances, the new taxes under the measure will represent the third time businesses and households will be charged for the same service. As noted in a recent criticism of the beverage container program,<sup>52</sup> California is the only state having such a program but allowing waste haulers to redeem bottles and cans for the fee paid by consumers. The report estimates waste haulers collect more than \$100 million of the consumer deposits annually.

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<sup>52</sup> Consumer Watchdog, *Trashed, How California Recycling Failed and How to Fix It*, January 2020.

# Cost Estimates

## Summary Costs

### Estimated Annual Costs: Summary Total

*Source: see text; all dollar amounts (except per household) in millions*

Cost Component	Tax	Other Direct	EPS Cost	2030 Cost	Total Cost
Foodware	\$816		351	\$34	\$1,201
Bottles & Containers	286				286
Meat, Fish & Poultry Packaging	46				46
Other Packaging	3,096			119	3,215
Compliance					
Recycling/Composting Capacity		548			548
Data & Reporting		3,400			3,400
General Fund Appropriation		200			200
Total (million)	\$4,286	\$4,148	\$351	\$153	\$8,895
<b>Equivalent Cost for Household of 4</b>					<b>\$901</b>

As discussed in detail below, the direct costs of the proposed measure are \$8.9 billion annually, although the 2030 component to replace non-complying materials will be phased in over time. These costs will if not immediately at best over time will be paid directly through higher costs and indirectly through other paths, at the equivalent rate of about \$900 annually for a household of four.

These estimates are only for the primary direct costs. In addition, there are other provisions—notably the required 25% reduction in single use plastics packaging by 2030 and a number of additional authorities given to the department—that will have further substantial but currently more speculative effects on households, businesses, and the state economy. These additional factors are discussed below in more qualitative terms.

## Cost Components

The breadth of the measure presents challenges in calculating a defined cost. The many provisions will affect a high percentage if not nearly all products produced and/or consumed in California—other than the pharmaceutical and agricultural applications with specific exemptions—beginning with resource extraction and delivery, production parts and components, goods and materials transportation, final goods sold, and goods imported into the state. To simplify the analysis, the calculations are derived from broader market estimates and where available, end user demand rather than attempting to trace these factors through the goods production and distribution chain.

The different components of the analysis quantify the following provisions of the measure:

- Tax costs are estimated from base year use levels. The new tax likely will continue to apply to the same universe of products regardless of the general compliance options that will be adopted by businesses in California and those selling into the state. Under the measure, even compliance responses that seek to expand recycling and use of renewables (e.g., bioplastics, paper and pulp) will still see the resulting products subject to the tax. Even plastics made from recycled or renewable-based resins—core objectives of the measure—are still treated as single-use plastics for tax purposes. Replacements for the paper and pulp products affected by the measure likely will still need a coating of some sort, replacing PE with PLA or other bioplastic at least within a medium time frame.

The total tax revenue base presumably will decline by 2030 due to the requirement for an overall 25% reduction in single-use plastic packaging and foodware use by individual producers. However, this provision is likely to be offset by indexing the tax rates to inflation (currently running at an annual average of 6.0% as of November 2021). Even if inflation were to suddenly contract to a 3.0% annual rate, the mandated tax rates still would be at least 27% higher in 2030, offsetting the 25% packaging reduction. In addition, because this reduction is to be based on 2023 numbers—a point when it is still uncertain that the California economy will have regained full recovery and the base numbers are therefore likely to be artificially low—the 25% standard will have the practical effect of expanding the share of affected goods over time. The potential is high that the department will be forced to issue a large number of individual exemptions in order to prevent goods shortages and consequent effects through accelerating inflation.

These factors are noted in the analysis, but no adjustments are made for these reasons and the fact that total tax revenues will remain at the higher and growing (due to indexing) levels at least through the first several years of implementation. As with most of the other components, estimates are made from the 2019 base year numbers with no adjustment.

- Alternative materials costs cover a scenario based on the lowest number of items that likely will have to be replaced with complying alternatives under the measure: (1) EPS Costs to replace all current expanded polystyrene foam foodware, and (2) 2030 Costs to replace non-complying materials that will have to meet the 2030 requirement that all affected products must be reusable, refillable, recyclable, or compostable. The foam foodware provision is stated in the measure. The primary non-complying material likely to fail the 2030 standard is coated or laminated paper containing a PE component. These products are not fully compostable due to the PE component. Food contaminated paper foodware—even those with a PLA or other bioplastic lining—are not accepted by most if not all local recycling programs due to the potential contamination of otherwise marketable paper bales. These calculations assume that recycling capacity under the measure will be expanded sufficiently to qualify most plastics as recyclable, and that new composting facilities under the measure will be willing to accept bioplastics.

The reusable/refillable options are assumed to be economic only in limited circumstances, comparable to the previously discussed RPPC program results where only 5% of regulated containers chose this compliance option and even at that level have likely captured most of the currently economic cases where this option can be applied. If substantial economic

opportunities still remained outside potentially some limited food service situations, they likely would have already been adopted due to the existing RPPC regulations.

- Other Direct Costs include: (1) higher compliance costs incurred by producers, as subsequently defined, for the significant new data collection and reporting requirements under the measure, (2) cost of expanding local recycling and compost programs to accommodate the higher levels of waste diversion, and (3) costs of redirecting at least some level of general fund revenues as the result of setting minimum funding levels for specified state agencies.

## General Assumptions

General factors applied to the analysis of each of cost components are as follows:

- All analysis is done using 2019 as the base year. This base enables the use of more complete data while avoiding any distortions that would arise while attempting to forecast across the current pandemic conditions. For example, use of single use protective plastic packaging likely is much higher currently than previously projected in prior studies as households have adjusted to the effects of state-ordered shutdowns and as global supply chain disruptions have continued to affect supplies and prices. Key factors include a shift in household consumption to delivered food and takeout, shift from consuming services to packaged goods,<sup>53</sup> overall rise in internet sales<sup>54</sup> and consequently an increase in packaged deliveries compared to purchases at retail outlets, and stockpiling at different points in the pandemic period due to goods shortages. While the extent to which California will return to a “normal” trend as defined by the pre-pandemic conditions in 2019 remains yet to be seen, the use of this base year allows for more consistent analysis without attempting to address multiple uncertainties, including whether the state’s first-ever population drops in 2020 and 2021<sup>55</sup> will continue in the upcoming years.
- Potential costs are assessed at the maximum point of the provisions applied to the 2019 data.
- Cost estimates assume that the subsequent regulations will define remaining plastic use as recyclable based on the development of sufficient recycling collection, sorting, and reuse capacity to increase recycling above current levels although not necessarily to 100% for all resins. This assumption is consistent with the measure’s emphasis on recycling and various provisions to promote the use of recycled resins.
- All taxes are assumed to be charged at their initial maximum level given the likely competition for this new funding.
- No adjustments are made for the different timing considerations in the measure. Because it is to be implemented through regulation, the proposed ban on expanded polystyrene foam

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<sup>53</sup> US Bureau of Economic Analysis, Personal Consumption Expenditures (PCE) by Major Type of Product, California.

<sup>54</sup> Plastic Waste from Amazon Purchases Soared by 29% Amid Pandemic, Report Finds, San Francisco Chronicle, December 23, 2021.

<sup>55</sup> US Census Bureau, State Population Totals and Components of Change: 2020-2021

foodware is assumed to be implemented as a phased process in order to avoid other costs on end users to replace existing stocks with alternative materials. Similarly, no additional costs are assumed given the challenges of implementing the new tax on a back-dated basis as of January 1, 2022, with no possibility of being able to put the required administrative structure, rules, and data flows in place.

- All related costs—e.g., CalRecycle administrative costs, required local costs for administering the new programs—are assumed to be contained within the projected tax revenues. Individual items where this assumption may not hold are included in the qualitative cost discussions.
- The measure’s prohibition on treating combustion as an acceptable recycling application is assumed to be continued in the regulations to cover non-combustion thermal technologies as well, in accordance with current department policies and practices. These applications would include chemical recycling to create in essence virgin resins from recycled plastics along with pyrolysis and gasification to convert non-recyclable materials into electricity, biofuels, and chemical feedstock.

## Single Use Plastic Foodware

### Estimated Annual Costs: Foodware, 2019

*Source: see text; all dollar amounts in millions*

End User	Demand (billion units)	Tax	EPS Cost	2030 Cost	Total Cost
Coffee & Snack Shops	10.9	\$109	\$51	\$6	\$167
Full Service Restaurants, Cafes, Bars	6.5	65	33	1	99
Institutional	6.2	61	32	2	95
Quick Service Restaurants	38.9	389	160	19	568
Retail Establishments	7.5	74	34	4	112
Lodging & Hospitality	4.3	43	12	1	56
Sports & Recreation	4.5	45	17	1	63
Other Establishments	3.0	30	12	1	43
Total	81.7	\$816	\$351	\$34	\$1,201

The cost numbers in the summary table above were estimated through the following steps:

- All numbers are based on projections of national demand<sup>56</sup> for these items by end user type, foodware type (e.g., hot cup, lid, clamshell), and material (paper, rigid plastic, expanded polystyrene foam, foil, renewables). The projections used in the analysis cover both demand value and unit numbers within each category.
- The national numbers by end user type were converted into California estimates through a series of steps: (1) initial allocation used industry employment (BLS Quarterly Census of Employment & Wages) as a proxy for most end users, with population used for Institutional and Other; (2) numbers were then adjusted for differing regional levels of expanded

<sup>56</sup> Freedonia Group, Foodservice Single-Use Products, Study #3774, February 2020.

polystyrene foam use, specifically overall lower use in the Western States, based on proprietary information previously obtained from the restaurant industry; and (3) a final adjustment was made to account for expanded polystyrene foam restrictions by type of restriction already enacted by some coastal local governments, assuming these restrictions have been fully effective. Retail sale of these foodware products is not included in the projections, but is treated as incidental to the results particularly since the measure's restrictions are placed on food vendors rather than limits to retail sale.

Note that "Institutional End Users" includes use by state and local agencies and schools. Within state government, there are a number of agencies that operate food or nutrition programs, with counterparts in local government in many cases. These programs include:

- Department of Aging, Congregate and Home-Delivered Nutrition Programs
- Department of Corrections & Rehabilitation (lunches only—dinner and breakfast served with reusable foodware)
- Higher Education, dorms and on-campus food facilities
- Department of Health Services, State Hospitals
- State Parks, food vendors at parks and museums
- Department of Rehabilitation, Business Enterprises Program vendor operators program at state and other government facilities for the legally blind
- Department of Social Services, various programs
- Department of Veterans Services, Veterans' facilities
- K-12 Schools, nutrition programs funded through state funds and federal funds pass-through

Some of these programs are already subject to some parts of the measure pursuant to the SB 1335 (Chapter 610, Statutes of 2018) regulations applied to contractors and concessionaires operating at state facilities, but the bulk including K-12 Schools are not. The proposed measure would increase foodware costs in these programs further.

- No factor is included for imports as most of the affected products made from traditional plastic and paper materials are produced in California and elsewhere in the US. As discussed later, many of the alternatives especially bioplastic and certain types of pulp products are imported. Overall use of these alternatives is currently minimal, but food vendors or wholesalers handling these products for distribution in California under the measure are likely to be designated as the producers for tax purposes.
- The cost estimates in the table above are presented in three components: (1) Tax component calculates costs from applying the proposed tax to estimated end use by product type and material estimated for 2019, (2) EPS Replacement calculates the additional costs of replacing expanded polystyrene foam products with complying recyclable/compostable alternatives (generally recyclable rigid plastics, bioplastics, pulp/bioplastic lined products), and (3) 2030 Replacement calculates the additional cost of replacing remaining items that are not recyclable or compostable, generally PE-lined paper, net of any potential reductions in the tax rates. All taxes are assumed to be charged at their initial maximum level given the likely competition for this new funding.

A component for a 25% reduction in use by each producer by 2030 is not incorporated due to the factors previously discussed. Some Institutional end users may have the opportunity to comply with this provision through addition of-site dishwashing operations at an additional cost. Smaller food vendors such as food trucks and small take-out restaurants in particular already have a strong economic incentive to keep their disposables use to a minimum given currently low operating margins, and compliance with this provision instead likely will mean cutting back sales, restructuring menu offerings, or eliminating take-out food options.

- Costs where current plastic use (including PE-lined paper) will have to be replaced with compliant alternatives under the measure in both cases are based on an extensive review of state, local, and school procurement data. This data source ensures comparison of current item use with realistic alternatives that have been determined to have equivalent product performance characteristics by public procurement staff. This approach ensures the alternatives used for the cost analysis will also be those used in practice. Sources include data from over 60 state, local, and school agencies (including universities) obtained in recent years through public record requests along with contract pricing available on-line, including Department of General Services disposable food service supply contracts #1-17-73-02A and #1-17-73-02B<sup>57</sup> and comparable pricing from states with more extensive “green” product procurement such as Oregon Department of Administrative Services. Cost differences are based on how the items are used in practice. For example, lowest cost replacements for hot cups are based on lowest cost for a cup with a paper sleeve compared to cups incorporating this consumer protection through double walls, bioplastic foam coverings, or fold-out handles.

This data source also ensures the low costs used are based on a public bidding process, and are for items that are generally available rather than transitory sales prices. Prices paid by the private sector will generally be different, and alternative costs are consequently developed as a percentage rather than an absolute premium.

While the use of lowest cost alternatives in the calculations provides a conservative estimate of the likely changes in costs, a review of prior procurement data including detailed accounting data for individual public food vendor operations indicates costs in practice are likely to be higher, up to twice as high as those calculated here based on this data review. These differences arise as individual end users will choose alternatives based on factors beyond just lowest price, including product safety, display, stability, and sanitary considerations. Prices for many of the alternatives especially the currently available recyclable/compostable alternatives also have been more variable over time, and alternatives are selected to reduce this sourcing risk as well. Under normal circumstances, this volatility is due to the historically more changing supply conditions for these products. In the current circumstances, these products—many of which are imported—also have been subject to supply disruptions at different points during the pandemic period and especially in the last several months due to cargo congestion at the California ports and at different points in the supply chain.

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<sup>57</sup> In both cases, the analysis used pricing in effect prior to the recent supplements that reflect volatility in commodity pricing during the pandemic period, November and May 2021, respectively.

- The alternative cost premiums expressed as a percentage increase were then applied to the current cost of individual items (by foodware and material type) required to be replaced by the measure. The costs are expressed as the additional costs that would be incurred to procure alternative foodware.

From this cost analysis of the alternatives, the tax itself is not expected to generate substantial shifts in the use of different foodware materials or management measures, at least in the short to medium terms. While there will be instances of potential savings where the cost of a materials shift will be offset by reductions in the tax for some smaller items such as portion cups, most alternative material costs currently would incur a much higher cost premium, especially when considered from a full end of goods sold analysis that takes into account likely higher transportation and breakage/spoilage costs. The cost differences in many cases are measured as a few cents per item, but they are a few cents higher than the proposed tax. Accumulated over the full range of existing use, these costs add up to levels capable of affecting current operating margins. Most companies currently making these shifts already under their ESG policies are doing so while expecting to minimize additional costs, not avoid them altogether.

The impact of a few cents per item aggregated over the full range of current consumption can be illustrated by the effect of the estimated foodware costs on operating margin by end user. As shown in the table below using the national numbers from the Freedomia study, the expense margin for single-use foodware subject to the measure averaged 1.7% of total food service revenues in 2019, but ranged from 0.5% to 5.2% depending on the end user. Applying the California results, the tax under the measure would increase current cost margins for the affected foodware by nearly half. Costs to secure alternative material products under both the EPS ban and the 2030 source reduction requirements—which may entail doubling or tripling the cost now paid for some foodware items—will eat into operating margins even further.

**Single Use Foodware as a Share of Food Service Revenues, US, 2019**

*Source: see text*

End User	EPS	Rigid Plastic	Paper	Compostables	Total Subject to Measure	Tax	Total with Tax
Coffee & Snack Shops	0.7%	2.1%	1.3%	0.1%	4.1%	1.7%	5.9%
Full Service Restaurants, Cafes & Bars	0.1%	0.2%	0.1%	0.0%	0.5%	0.1%	0.6%
Institutional	0.8%	1.2%	0.6%	0.1%	2.7%	0.9%	3.6%
Quick Service Restaurants	0.4%	1.2%	0.6%	0.0%	2.3%	1.0%	3.3%
Retail Establishments	1.2%	2.4%	1.6%	0.1%	5.2%	1.8%	7.1%
Lodging & Hospitality	0.4%	1.1%	0.8%	0.0%	2.3%	0.9%	3.2%
Sports & Recreation	0.7%	2.5%	1.0%	0.1%	4.3%	1.7%	6.0%
Other Establishments	0.6%	1.4%	1.0%	0.0%	3.0%	1.1%	4.2%
Total	0.3%	0.8%	0.5%	0.0%	1.7%	0.7%	2.4%

Most of the end users already have relatively small operating margins to begin with, in the 2% to 6% range, with full serve operations trending lower and fast food vendors somewhat higher under normal circumstances, but all end users have seen their margins tightened by reduced sales, higher labor costs to combat labor shortages, and additional COVID-related measures. The tax under this measure alone will eliminate the current margin for many food service operations, forcing them to increase prices if they can and pursue other cost reduction strategies if they still are available after

two years of an economic downturn. The costs to comply with the source reduction requirements will squeeze what remains of these operating margins even further.

Note that the estimates in the tables above are rely on the assumption that rigid plastics will be considered recyclable and can be acceptable low cost alternatives especially to replace expanded polystyrene foam. If instead fully compostable/recyclable alternatives are required—generally bioplastics or paper/bioplastic items—the cost for EPS alternatives alone would go from \$351 million annually in the first table, to an estimated \$680 million annually for California food vendors. Costs to achieve the 2030 material compliance standards would be substantially higher as well.

## Bottles & Containers

### Estimated Annual Costs: Tax on Bottles & Containers, 2019

Source: Calculations from CalRecycle Biannual Report

Container Type	CRV Sales (billion units)	Tax (\$ million)
Plastic Containers	12.7	\$255
Glass Containers	3.1	31
Total	15.8	\$286

CalRecycle data<sup>58</sup> shows that in 2019, a total of 12.7 billion plastic and 3.1 billion glass containers subject to the state’s CRV fee were sold in California. Glass bottles generally have a metal cap, but even these have a plastic component to ensure a proper seal and product safety. The tax amount is consequently estimated at one cent per bottle. Plastic bottles containing both the bottle and a plastic cap will generally be subject to a double tax. The tax amounts are calculated only from those factors and do not incorporate additional costs for consumer packages using plastic rings or encasing film and additional plastic packaging used in shipping including wrapping film, strapping tape, or protective plastic inserts. The estimated tax shown in the table above would be in addition to the CRV fees (5 cents per container less than 24 oz.; 10 cents for larger), sales tax, bag fees, and excise tax (alcohol) currently paid by consumers directly or indirectly on all or a portion of these items.

No additional costs to meet the 2030 standards are expected, as the current program is focused on achieving high levels of recycling for these materials. In addition, high quality PET such as produced in this and comparable programs in other states has commanded prices at levels making these operations one of the few recycling applications that are economic on their own terms.

## Meat, Fish & Poultry Single Use Plastic Packaging

### Estimated Annual Costs: Meat, Poultry & Seafood Packaging, 2019

Source: see text

Packaging Type	Demand (billion units)	Tax (\$ million)
Plastic	4.2	\$42
Paper	0.4	4
Total	4.6	\$46

<sup>58</sup> CalRecycle, Biannual Report of Beverage Container Sales, Returns, Redemption, and Recycling Rates, May 11, 2020.

While prior packaging restriction proposals such as those in the measure generally exempt these applications on sanitation and food safety grounds, the measure as written will encompass these as well. Primary data was taken from a national market study,<sup>59</sup> with California’s share estimated based on population share in 2019. The paper applications covered are those using coated paper. Plastics include rigid plastics, bags and pouches, and expanded polystyrene foam.

Tax estimates are based on a single item of plastic in each case, although several of these will incorporate other plastic pieces such as a covering film, lid, tape, and additional bags supplied at the point of sale for further sanitary protection. Due to the wide range of possibilities, an additional component is not included for this factor, but is instead covered in the following estimate for all remaining uses.

The 2030 replacement cost estimates assume current plastics use will be deemed recyclable based on expansion of recycling capacity—both technical and economic—under the measure. As with foodware, the coated and laminated paper applications are likely to require replacement with alternatives by 2030. Because of the different uses and sizes of the paper vs. plastic applications, the lowest cost alternatives used in the calculations involve the addition of or replacement with a plastic bag, resulting in a negligible net effect both on packaging costs and tax costs although not necessarily the objectives of the measure.

## Other Single Use Protective Plastic Packaging

### Estimated Annual Costs: Other Single Use Plastic Packaging, 2019

*Source: Calculations from CalRecycle Biannual Report*

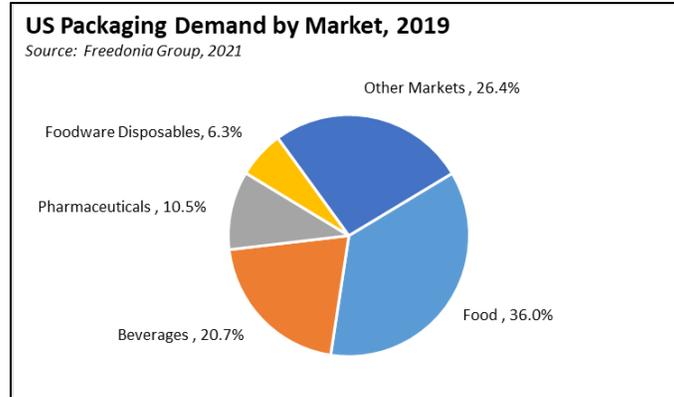
Packaging Type	Demand (billion units)	Tax (\$ million)	2030 Cost (\$ million)
Plastic	209.0	\$2,090	\$0
Paper	7.8	78	119
Total	216.8	\$2,168	\$119
Imported Nondurable Goods	92.8	928	0
Total	309.6	\$3,096	\$119

Total materials use for production of packaging in the US is taken from a similar market study of national trends.<sup>60</sup> Imports and exports of packaging play a minor role in the overall numbers due to the relative low cost/high weight (both in terms of absolute and volume-weight terms) of these products. Production to meet domestic packaging demand consequently is generally near the end user markets, nationally and regionally for some of the heavier weight items such as paper, and by state and locally for the lower weight items such as plastics. In all, net imports accounted for only about 3% of the domestic packaging demand in 2019.

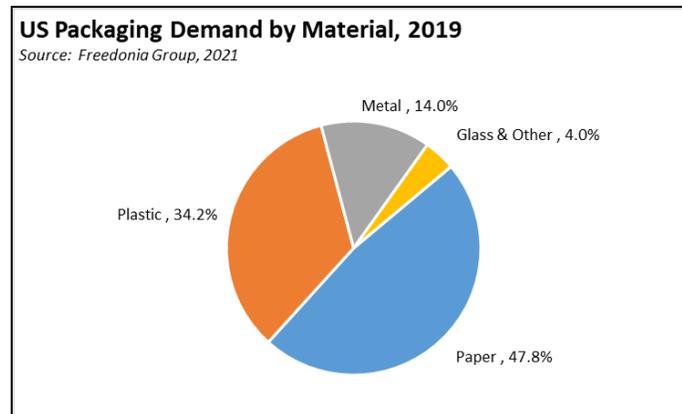
In total, food products accounted for just over a third of all packaging in 2019, followed by other markets at just over a quarter and beverages at about a fifth.

<sup>59</sup> Freedonia Group, Meat, Poultry & Seafood Packaging with COVID-19 Market Impact Analysis, March 2020.

<sup>60</sup> Freedonia Group, Packaging: United States, December 2021.



Paper (including cardboard and paperboard) comprised nearly half of packaging, with plastics at about a third of total demand.



Disaggregating this data, the number of other single use packaging likely subject to tax under the measure were estimated as follows:

- The portion applicable to goods sold in California was estimated by applying California's share of total population in 2019 to the individual packaging material components.
- Plastics used for single use protective packaging were estimated by subtracting the total amounts estimated previously for foodware, bottles and containers, and meat, fish, and poultry packaging.
- The coated or laminated component of paper use was estimated by: (1) adjusting the total paper use by a factor determined from lined paperboard production as a share of total paper production, using the product by industry sales data from the US Census Bureau's 2017 Economic Census, and (2) reducing the resulting amount by the foodware, bottles and containers, and meat, fish, and poultry estimates as above.
- The portion of glass packaging subject to the measure and included in the overall estimates is restricted to the bottle and container numbers above, although other glass and some metal packaging will have plastic components as well.

The net plastic and paper numbers were then converted into unit estimates using the appropriate counts available from the more detailed foodware analyses above. The foodware components provide a wide range of sizes and shapes that if not entirely representative of the full packaging universe likely subject to this measure, at least reach an approximation on a ballpark basis.

These numbers, however, only apply to products produced in the US. The prior estimates are based primarily on amounts flowing from production demand or products with currently only minimal levels of imports. A major component of total goods sold and consumed within the state, however, comes from imports. These products will be subject to the tax and restrictions of the measure as well.

To account for this factor, an additional amount to cover packaging of consumer goods imported for use in California was calculated from national GDP and personal consumption expenditures from BEA. Using only the nondurables good components of each, imports nationally accounted for about 30% of total nondurables personal consumption in 2019. Plastic packaging is also used for durables and imports of materials, parts, and supplies used for domestic production, but the use for nondurables accounts for the bulk of the total.

Replacement costs in 2030 are again estimated only for the plastic component, assuming recycling capacity will expand to allow compliance for the plastic uses. While the price differences vary widely by product type and size, the analysis for the foodware costs indicates that the price premium for the larger PLA-lined paper foodware items compared to comparable PE-lined products averages about 20%, although this premium reflects lower cost production of the PLA products in other countries and likely would be higher if sourced instead domestically. Applying this amount to the paper demand portion of this component results in an estimated 2030 replacement cost of \$110 million. No estimate is included for the import component as it is assumed overseas producers will in general have access to lower cost replacements.

## Compliance Costs

### Estimated Annual Costs: Compliance

Source: see text

Compliance Component	\$ million
Recycling Capacity	\$500
Composting Capacity	48
Data & Reporting	3,400
Total	\$3,948

In addition to the new taxes, businesses subject to regulation under the measure will incur additional costs to ensure compliance with the various provisions. These include: (1) costs to come into compliance with the various content and material requirements including any the department chooses to impose under its additional authorities in the measure, and (2) core compliance costs for the extensive data and reporting requirements that will be subsequently determined by the department. Companies will also incur additional substantial expenses for packaging redesigns especially for those destined for a California market, but these are not incorporated as a separate

item. These will net out over time as new products are introduced, but there will be a significant upsurge in the initial years to address each individual product line currently sold in the state.

The first compliance component cost will vary depending on how the department chooses to administer the program:

- If all currently landfilled and littered plastic is handled through expanded recycling programs, costs to households and businesses would increase by another \$500 to \$750 million a year. This cost is estimated from the total amount of plastics in disposed MSW in 2018 (see Single Use Plastic Packaging in the Waste Stream: California), the estimated amount of plastics annually entering the marine environment off California (calculated from the factors in Plastics Pollution), the estimated average cost per ton of recycling (see Plastics Recycling), and for the low estimate, reduction equivalent to one standard deviation to account for the likelihood of excess capacity in existing local programs or, a less likely assumption, sustained assistance from revenues generated by the measure. Costs to compost the current paper amounts—under the assumption these uses are shifted to PLA or other bioplastic lining—would be an additional \$48 million a year.
- Alternatively, plastics instead could be handled through a take-back and deposit refund program similar to the current program for bottles and containers. Based on the current bottle program costs, this approach would require costs similar to the recycling option, at an estimated \$500 million a year as well.<sup>61</sup> This approach, however, would likely only cover plastic wastes capable of central collection at the same level as bottles. Some degree of local recycling and composting expansion would still be required in order to achieve the full diversion levels expected in the measure. In addition, this estimate also assumes another \$500 million would be sufficient to counter the failures in the bottle program that have become apparent in recent years, including the closing of a significant share of its required infrastructure due to rising costs of operating in the state.

Compliance costs for data and reporting requirements under the measure were estimated as follows:

- A previous CalRecycle report<sup>62</sup> estimated that these compliance costs under the state's RPPC program—which has many similar provisions as those contained in measure—were \$100,000 a year for a medium sized business. Escalating this cost to a 2019 equivalent results in \$147,000 a year. To put this cost into context, the average California wage for a Compliance Officer (all industries) in 2019 was \$82,310.<sup>63</sup> Using the average BEA data for private wage and salary workers in California, total average compensation per compliance officer is \$100,200. The \$147,000 consequently is sufficient to cover one employee doing this work full time, plus additional expenses for data and administration and other benefits not covered in the BEA compensation data.

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<sup>61</sup> Consumer Brands Association, Cost Estimate of CA Ballot Initiative (A.G. File No. 19-0028, Amendment #1): CPG Industry Impact, January 2022.

<sup>62</sup> Integrated Waste Management Board (CalRecycle predecessor), Plastics White Paper, Optimizing Plastics Use, Recycling, and Disposal in California, May 2003.

<sup>63</sup> US Bureau of Labor Statistics, Occupational Employment and Wage Statistics, May 2019.

- The RPPC program, however, covers only a limited number of products and not virtually the full range of products sold in the state as would be the result under this measure. The estimates in the bullet above were further adjusted to account for this factor: (1) adjusted to 10% as large for smaller firms (20-99 employees) who are assumed to acquire compliance services from consultants, (2) double for medium sized firms (100 to 499 employees) due to significantly increased complexity of the tracking required compared to the RPPC program, (3) a factor of 4 for large firms (500 and over) due to the larger number of products handled, and (4) a doubling for each size category of nonstore retailers due the large number and shifting range of products offered for sale.
- The definition of producer responsible for this tracking and for payment of the tax is a cascading series of potential businesses designed to ensure the state receives the full amounts due. The potential universe subject to these costs likely will change over time, but companies down to the last seller of the affected products are potentially liable for the full amount owed. All businesses engaged in production, transport, and sale of the affected products at any point in their life cycle will also be liable for any violations of the measure, including any regulations the department later puts out, and potentially at risk for substantial fines. As a representative base of the potential universe affected, the cost estimates are based on the primary end users in the state: core nondurable goods manufacturers, wholesale trade, retail trade, nonstore retailers, and accommodation and food service. Data by size of establishment is taken from EDD,<sup>64</sup> as shown in the table below. These estimates also assume the smallest firms (0-19 employees) will be exempted under the department’s additional authorities.

**Number of Establishments Potentially Affected by the Measure, 2019**

*Source: EDD*

Employees	0-19	20-99	100-499	500+	Total Affected
Selected Nondurable Manufacturing	8,727	2,107	643	69	2,819
Wholesale Trade	57,747	6,424	911	57	7,392
Retail Trade (including nonstore)	89,016	14,272	2,928	45	17,245
Accommodation & Food Service	61,585	25,753	1,462	80	27,295
Total	217,075	48,556	5,944	251	54,751

- The numbers shown in the table, however, are only used as the basis for an estimate. The data shown is for the number of establishments, and individual businesses may be composed of one or several establishments. The numbers from this perspective are an overestimate. Countering this factor, the definition of producer is broad and encompassing in the measure, reaching companies in other states and other nations if their products are sold in California or if they were involved in related supply or transport at any point in the life cycle process. From this perspective, the costs estimated here are very much on the lower end of the potential, especially given that the measure places the onus—along with the risk of substantial fines—for compliance on the producers, however they may eventually be

<sup>64</sup> EDD, Size of Business Data, 2010-2020, 2019 3<sup>rd</sup> Quarter. Note some estimates have been made to account for data in the table subject to nondisclosure rules.

defined. And far more than the 55,000 establishments shown are at risk of meeting this definition.

Combining these factors, annual compliance costs for data and reporting would be \$3.4 billion a year. A recent similar cost estimate<sup>65</sup> looking just at the Consumer Packaged Goods and Retail industries puts the cost at \$2.8 billion a year.

## General Fund Appropriation

Section 42382(k)(3)(B) requires that general fund appropriations for the specified agencies remain at least at the levels contained in the 2019 Budget Act.

Historically, general fund allocations for the Natural Resources agencies have been in decline as special funds and fees, bond funds, and federal funds have comprised a larger share of their overall budget along with expanding deferred maintenance levels that saw many state facilities becoming unusable. This trend was accelerated during the Great Recession as general fund revenues plunged due to the economy but also from a shift of formerly general fund revenue sources to special funds, especially under the 2011 Realignment of program responsibilities and funding sources from the state to local governments.

Following an expected \$21 billion surplus, the 2019 Budget Act was a near-term high point for general fund appropriations to these agencies as revenues became available for both one-time expenditures and creation of new programs. As shown in the following table, general fund appropriations to the subject agencies surged to \$557 million in the 2019 Budget Act.

After dropping in the subsequent year, general fund allocations then more than tripled in the most current 2021 Budget Acts. These additional amounts were major one-time and limited term spending funded through the unprecedented revenue growth experienced by the state during the pandemic period.

This most current number, however, is the result of strong revenue numbers driven by a surge in capital gains, particularly from the high level of IPOs in the Bay Area and a booming stock market. Current projections<sup>66</sup> expect revenues will remain elevated in 2022, with continued growth over the subsequent 4 years.

In the longer term, however, the revenue picture is more uncertain. Capital gains are highly variable. The extreme progressivity of the state revenue structure and its overreliance on a relative handful of taxpayers means revenues react strongly to any economic downturn. Additional pressure on general fund is likely to return as spending, particularly new spending now being started in various social benefit and health care programs on the back of the current surpluses, grows faster.

The natural resources programs as historically a much lower priority in the state budget process consequently will likely remain one of the first targets when general fund for other purposes is needed in the inevitable future budget shortfalls. As a recent example, general appropriations to

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<sup>65</sup> Consumer Brands Association, Cost Estimate of CA Ballot Initiative (A.G. File No. 19-0028, Amendment #1): CPG Industry Impact, January 2022.

<sup>66</sup> Department of Finance, General Fund Multi-Year Forecast, 2022-23 Governor's Budget, January 2022.

these agencies in the austerity 2020 Budget Act plunged to \$355 million, although revenues coming in well above the Budget Act estimates later led to restoration of many of the cuts. This tendency to target these programs in bad budget years also is likely to be enhanced by the addition of billions in new, but largely non-fungible, spending under the Resources Agency should the measure be enacted.

Given these vagaries in the budget process, the 2019 Budget Act numbers likely will be a factor moving forward. While the actual effect will depend on a great many factors, a general estimate can be made by looking both forward and backward from 2019. Looking backward, the 2019 appropriations were about \$200 million higher than the prior three-year average. Compared to the appropriations in the 2020 Budget Act—at a point the state was projecting a substantial deficit and consequently the most recent example of what happens to the natural resources programs when funds are wanted for other priorities—appropriations were cut by about the same \$200 million amount. The current fiscal impact of this provision is consequently estimated at \$200 million a year.

### Agencies Subject to the General Fund Minimum Provision

Source: Department of Finance, SB 170 (2021)

<i>(Million)</i>	2016-17	2017-18	2018-19	2019-20*	2020-21*	2020-21	2021-22*
Natural Resources Agency	\$7.1	\$7.5	\$41.6	\$116.3	\$9.1	\$16.0	\$231.9
California Coastal Conservancy	1.1	15.0	21.4	12.0	0.0	12.0	25.2
Department of Fish & Wildlife	104.4	104.6	125.3	138.3	137.1	142.7	383.3
Department of Parks & Recreation	137.5	212.0	196.7	271.9	190.3	315.4	1,080.5
Wildlife Conservation Board	18.9	20.6	19.2	18.6	18.6	28.4	115.4
Total	\$269.0	\$359.7	\$404.2	\$557.1	\$355.2	\$514.5	\$1,836.2

Notes: \*Appropriations from applicable Budget Acts; other entries are actual/estimated expenditures in subsequent budget acts

In the table:

- The 2019 Budget Act appropriations are shown under 2019-20.
- The 2020 Budget Act is shown under the first entry for 2020-21, with the second set the currently estimated actual expenditures as revised in the 2021 Budget Act
- The 2021-22 numbers are taken from Department of Finance Schedule 9 for all budget actions through July 2021, adjusted for the additional amounts appropriated under SB 170 (Chapter 240, Statutes of 2021) in September.
- The first three columns are the actual expenditures as taken from the applicable Schedule 9.
- The Ocean Protection Council is not listed as a separate agency as its budget is incorporated into the Natural Resources Agency amounts.

### Other Costs Not Included in the Analysis

There are a number of other costs coming from the measure—both those directly associated with individual provisions and indirectly as various packaging requirements are changed—that are not included in the estimates due to their more speculative nature. These include:

- The most significant element not covered in the cost estimates is the cost of packaging changes coming from the requirement to reduce by both weight and number the amount of single use plastic packaging by 25% by 2030. The inclusion of the number criteria restricts the application of more traditional source reduction methods, which focus more on reducing packaging material use while still retaining the same protective levels. The requirement that bioplastics and recycled plastics still be treated as plastics for these purposes of this provision and the tax provisions limits additional current response options, while the inclusion of materials partially made from plastic—notably plastic-coated paper products—eliminates the largest and currently most economic response option especially for foodware.

Costs will vary widely due to requiring a 25% reduction for each producer, with larger corporations having more flexibility particularly if company-wide options are provided as in the RPPC program and smaller operations instead being faced with fewer options that in some cases such as food vendors may be limited to reducing sales or reducing the number of offerings being sold. In addition, the 25% reduction is to be measured against the estimated base use—by producer—in 2023. There is no indication yet that the California economy will fully recover by this point let alone individual “producers” as subsequently defined by the department. This provision consequently is likely to be more restrictive than otherwise expected, with a more steeply rising effect over the portion of goods sold within the state. Individual producers who have not fully recovered sales level by that point will face substantial added barriers to their survival.

- The source reduction requirements will also have unknown cost effects on consumer purchases and available product options. In some applications, compliance can be achieved by reducing package sizes, for instance actions taken by bottle manufacturers to reduce material use through light-weighting and reducing the size of PET and HDPE bottles as demographics have shifted to smaller households.<sup>67</sup>
- Related items such as transportation costs are likely to rise as both the size and weight of packaging shifts away from plastics with more cost-effective weight, protective, and clarity characteristics. These costs will depend on the final packaging mixes chosen, but transportation will not necessarily be a linear change. Shipping costs (less than container ship, rail, truck) currently are based both on actual and on volumetric or dimensional weight. Using the UPS Express formula as an example, assume a package 24x24x24 expands 10% in each direction to accommodate paper fill to replace plastic components. Assuming the original package weighs 50 pounds and the new packaging adds 1 pound (outer container and fill), the actual weight would increase 2%. The volumetric weight, however, on which the shipping rate is based in this example would increase 30%. Larger producers shipping full loads are likely to avoid this trade-off—although more container/car/trailer space will be required for the same amount of goods sold. Smaller producers will see shipping costs rise relatively higher.

Both, however, will be seeing these costs change during the current period of supply disruptions, increasing the volatility of this cost component. While it is possible these

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<sup>67</sup> Association of Plastic Recyclers, 2018 United States National Postconsumer Plastic Bottle Recycling Report, 2019.

disruptions will be resolved by the time the measure becomes effective, cargo backups continue to increase at the Southern California gateway ports for Asian trade.<sup>68</sup>

Transportation costs while previously less significant in final product prices due to the prior efficiencies gained in the supply chain, have become more important,<sup>69</sup> particularly as rates remain elevated and as cargo theft centered in Southern California has become more of an issue.<sup>70</sup>

- The measure also grants a number of additional authorities to the department that would increase costs in the future. These are not included in the cost estimates as the department's capabilities are likely to be tested just in trying to fulfill the mandates under the measure. But as illustrated by the department's historical actions such as in the RPPC program, regulations to pursue at least some of these options are likely to move forward in the future, either on the department's own volition or pursuant to existing statute that allows outside groups to petition a state agency to begin a rulemaking. The additional authorities not addressed in the cost estimates are:
  - The measure allows the department to second-guess packaging decisions made for every product sold in the state—at any point in its production, transportation, or sale process—with single use plastic packaging. The department would be able to do this for individual producer goods, broader good/packaging applications, and formulation of specific materials used for packaging.
  - Allows the department to issue and change content specifications for the affected packaging. Previously, decisions of this economic importance to households and businesses have been reserved to the Legislature.
  - Allows the department to require take-back programs and impose additional fees for this purpose. Again, these decisions and their cost implications have previously been reserved to the Legislature.
  - Allows the department to create new labeling standards, potentially creating confusion with the labeling this packaging already carries and potentially, along with the prior provisions, requiring companies to incur costs to set up separate lines for packaging of goods sold in the California market. Companies supplying goods for sale into the California market would also incur liability risk for substantial fines should goods destined for non-California markets be sold in the state through third-party suppliers.

## Employment

**Jobs Directly Affected by the Measure.** In 2019, California wage and salary jobs within the production industries likely to be affected by the measure totaled 40,159 in 1,275 establishments. Average annual wage was \$60,271, ranging by industry component from \$50,632 to \$80,007. These

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<sup>68</sup> Is There an End in Sight to Supply Chain Disruption, Financial Times, January 9, 2022.

<sup>69</sup> Rising Shipping Costs are Companies' Latest Inflation Riddle, Wall Street Journal, September 16, 2021.

<sup>70</sup> Piles of Trashed Amazon and FedEx Packages Along Tracks. California Is the Top Target for Cargo Thieves, NBC Los Angeles, January 20, 2022.

jobs include just over a thousand engaged in the reprocessing of recycled plastic resins (NAICS 325991).

### California Packaging Employment, 2019

Source: EDD, *Quarterly Census of Employment & Wages*

Industry	NAICS	Establishments	Employment	Ave. Ann. Wage
Plastics:				
Plastics material and resin manufacturing	325211	138	2,388	\$71,591
Custom Compounding of Purchased (recycled) Resins	325991	36	1,045	\$54,645
Plastics bag and pouch manufacturing	326111	70	2,979	\$55,159
Plastics packaging film and sheet mfg.	326112	53	1,587	\$51,541
Polystyrene Foam Product Manufacturing	32614	65	1,715	\$50,632
Urethane and Other Foam Product Mfg.	32615	93	2,943	\$56,524
Plastics Bottle Manufacturing	32616	49	4,057	\$80,007
All Other Plastics Product Manufacturing	326199	528	16,118	\$56,920
Total Plastics		1,032	32,832	\$59,984
Paper:				
Paperboard Mills	32213	13	436	\$77,672
Folding Paperboard Box Manufacturing	322212	50	2,641	\$68,313
Other Paperboard Container Manufacturing	322219	35	1,525	\$51,667
Paper bag and coated and treated paper mfg.	322220	90	1,746	\$60,267
All other converted paper product mfg.	322299	55	979	\$53,847
Total Paper		243	7,327	\$61,555
Total Packaging		1,275	40,159	\$60,271

These industries had a substantially higher share of Latino workers compared to the state economy overall, at 56.5% of workers compared to 35.5%. Note that the following two tables are based on the 4-digit NAICS level encompassing the industries above, as this level is the finest detail available from the Quarterly Workforce Indicators data.

### Share of Wage & Salary Employment by Ethnicity & Race, California, 2019

Source: US Census Bureau, *Quarterly Workforce Indicators*

	All Industries	Packaging	Plastics	Paper
Latino	35.5%	56.5%	55.3%	58.9%
White	39.1%	26.5%	26.5%	26.5%
Asian/Pacific Islander	16.9%	12.1%	13.6%	9.4%
African-American	6.1%	3.5%	3.3%	3.9%
Multi-Race	2.1%	1.1%	1.1%	1.1%
Native American	0.3%	0.2%	0.2%	0.3%
Total	100.0%	100.0%	100.0%	100.0%

By educational attainment, these industries provided significant job opportunities for workers with less than a high school education or only a high school diploma. Jobs in the California packaging industries employed 51.2% of their workers at this skills level, compared to only 37.0% for the economy as a whole. The key distinction, however, is that jobs in the packaging industry provide these workers with higher, middle class wages compared to the minimum and just above wage levels workers with these skills are increasingly forced to take as middle class wage jobs such as these continue to decline in the state.

**Share of Wage & Salary Employment by Educational Attainment, California, 2019**

*Source: US Census Bureau, Quarterly Workforce Indicators*

	All Industries	Packaging	Plastics	Paper
Less Than High School	17.7%	28.4%	29.9%	25.6%
High School Diploma/GED	19.3%	22.8%	22.0%	24.3%
Some College	25.9%	26.2%	25.1%	28.2%
BA or Higher Degree	25.8%	17.3%	17.6%	16.8%
N/A	11.3%	5.3%	5.4%	5.1%
Total	100.0%	100.0%	100.0%	100.0%

While the actual number of jobs and businesses that will be eliminated within these components will depend heavily on how the measure is implemented and how terms are subsequently defined—in particular, the standards under which plastics will be defined as recyclable—the mandated 25% reduction by 2030 is a clear provision that will lead to a significant contraction and likely additional pressures for consolidation of remaining capacity to other states as business units within California face reduced sales. While lost California sales could be replaced with sales to other states and exports, these products tend to be produced closer to their end markets or, in the case of the heavier paper products, closer to their raw material source. For example, some consolidation is already occurring in the paper industry. Georgia Pacific recently announced the consolidation of its Dixie cup production including recycled fiber cups at a single facility in Kentucky,<sup>71</sup> and in California, produces primarily corrugated products.<sup>72</sup>

In addition, the expanded polystyrene foam ban for foodware will result in the closing of that production in the state. In 2019, there were four such production facilities in California.<sup>73</sup>

The overall direct costs estimated above from the measure will affect jobs within other industries as well. The proposed tax and related costs for packaging changes, regulatory compliance, and likely changes in waste management costs are not a matter of few cents. As indicated in the cost summary, they are substantial in the aggregate and will come at a time when the state’s employers are facing rising costs in a number of other areas:

- California continues to lag the other states in economic recovery. Based on November 2021 labor force numbers from EDD and BLS, California had the highest unemployment rate among the states, ranked 13<sup>th</sup> lowest in the share of nonfarm jobs recovered compared to February 2020, and 12<sup>th</sup> lowest in the share of employed persons recovered. The most recent economic projections from Department of Finance<sup>74</sup> do not expect to exceed the February 2020 numbers until 2023 at the earliest, but these numbers were completed in November 2021 prior to the current Omicron variant outbreaks and their still unknown effect on the economy. By at least one measure, the Finance inflation forecasts already are about 1% below the actual results, although we are only in about two months for purposes

<sup>71</sup> Georgia-Pacific Moving All Dixie Cup Production to Kentucky, US News and World Report, January 19, 2021.

<sup>72</sup> Georgia Pacific, About Us, Locations, California, accessed January 5, 2022.

<sup>73</sup> MB Public Affairs, Economic Impacts of a Potential Ban on Polystyrene Foam Food Service Products in California, August 2019.

<sup>74</sup> California Department of Finance, California Economic Forecast 2022-23.

of making a comparison. The proposed tax is effective the beginning of 2022, and other provisions would begin to be effective just at the time many businesses will still be trying to recover from the pandemic downturn if not facing renewed economic pressures from yet another variant.

- Continued supply chain disruption has produced rising costs for supplies and components, inventory, and transportation along with core shortages affecting overall production and sales. A spike in cargo theft<sup>75</sup> has added another element of chaos into an already unstable situation.
- Labor shortages continue to affect businesses throughout the economy. In the most recent data for November 2021,<sup>76</sup> California had 1.1 million unfilled job openings at the end of the month, compared to only 0.8 million during essentially full-employment conditions in November 2019. Wages overall are rising as businesses compete to fill these positions, with the average private sector hourly wage up 11% at an annualized rate in the latest data<sup>77</sup> in November 2021.
- Labor costs are also rising as the result of unemployment insurance tax increases to pay off the \$20 billion debt the state created during the pandemic period. Businesses face rising federal tax rates along with a long-term continuation of state rates at their current highest level to pay off this debt, likely over a period of more than 10 years and likely longer if the state experiences another downturn and consequent demands on these funds during this period.
- The plastics measure is not the only tax increase currently being contemplated for the November ballot. Current tax proposals include higher personal income tax, corporations income tax, and property tax through new split roll initiatives. In addition, the legislature last year saw additional proposals totaling \$236.4 billion in new taxes and fees.<sup>78</sup> The current portion of the session has already seen one measure alone that would raise taxes by \$163 billion.<sup>79</sup>
- State policies continue to drive energy costs well above the other states. In the latest data for October 2021 from US Energy Information Administration (12-month moving average), California's commercial and industrial electricity rates are now the highest among the contiguous states. Natural gas prices are now the 9<sup>th</sup> highest for commercial and 5<sup>th</sup> highest for industrial. In data from GasBuddy.com, gasoline and diesel prices are the highest of any state, with goods transportation-critical diesel more than a third higher than the average for all other states in December 2021.

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<sup>75</sup> Piles of Trashed Amazon and FedEx Packages Along Tracks. California Is the Top Target for Cargo Thieves, NBC Los Angeles, January 20, 2022.

<sup>76</sup> US Bureau of Labor Statistics, Job Openings and Labor Turnover Survey.

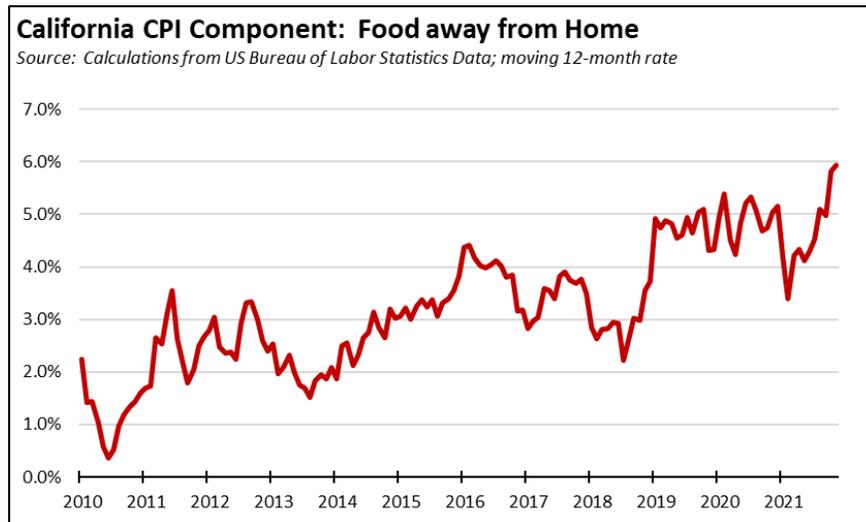
<sup>77</sup> US Bureau of Labor Statistics, Current Employment Statistics, California.

<sup>78</sup> CalTax, Tax and Fee Report, December 1, 2021.

<sup>79</sup> Tax Foundation, California Considers Doubling its Taxes, January 6, 2022.

These and other rising costs have already caused prices to rise as well. The most current survey of small businesses by NFIB<sup>80</sup> indicates a net 57% (response of “higher” vs. “lower”) small businesses nationally have already set their prices higher compared to three months ago. Another net 49% indicated their prices will go higher in next three months.

As a bellwether indicator of the consequent effects on consumers, the food away from home (restaurant and take-out food) component of the California CPI has seen much more sustained rises than food at home since 2010, spiking 5.9% in the latest results for November 2021. As low margin operators, businesses within this component of the economy tend to be more sensitive to operating costs changes. The costs from the foodware provisions will come on top of the persistent cost increases they already face. Calculations in the chart below are the same as those previously discussed for the food at home chart.



The increased costs under the measure will also have an indirect effect on jobs, as household budgets absorb the price increases and consequently are forced to reduce overall demand. These cost rises from the measure will begin at a time households are likely to still be facing high inflation—the highest in 40 years in the latest data from December 2021.

The headline numbers on inflation only report the rate. Calculations of actual household effects from the high inflation experienced in 2021 were recently done by researchers at the Wharton Model.<sup>81</sup> This study compared consumption by income group in 2019 and 2020 to determine how much more households had to spend in 2021 in order to maintain the same level of consumption of goods and services. Compared to 2019 spending, the top 5% (by income) of households had to spend \$8,326 more, or 6.0% more in 2021 just to maintain their prior consumption levels. The bottom 20% had to spend \$2,064 more, but because they consume relatively more of the categories showing the strongest price rises, their overall spending rate increase was higher at 6.8%.

<sup>80</sup> NFIB, Small Business Economic Trends, December 2021.

<sup>81</sup> Penn Wharton, University of Pennsylvania, Budget Model, Impact of Inflation by Household Income, December 15, 2021.

The Wharton study estimates that in total, all households spent an average of \$3,500 in 2021, not to increase their overall standard of living but simply to keep pace with rising prices. At an estimated \$903 average additional annual cost for a household of four, this measure would raise the current inflationary “tax” in California by another 26%.

**Jobs Created by the Measure.** The likely job losses will be offset at least to some degree through job creation as government funds are spent, additional materials become available for companies engaged in the recycling process or producing products from recycled plastics, and as companies shift their procurement from traditional single use plastic to alternative materials. The extent of such expansions again will depend heavily on how the measure is implemented, individual terms in particular recyclable defined, and the extent to which these jobs are created in California or in other states and other countries.

The Findings and Declarations section of the measure states that California’s current recycling programs have created 125,000 jobs. There does not appear to be any studies containing this estimate on the proponent’s website<sup>82</sup> or on the website for Californians Against Waste, which is cited as the source of this number in other references. The economic impact section of the Californians Against Waste website, however, indicates that the 125,000 is a broad count, incorporating employment in recycled materials processing and remanufacturing, collection (waste haulers) and sorting, and even traditional businesses such as automotive and appliance repair. The 125,000 estimate also appears to stem from at least 2011 when this jobs number was used to support passage of legislation increasing the state’s recycling goal to 75% (Chapter 476, Statutes of 2011).<sup>83</sup> That legislation was also promoted by the author based on the contention that raising the goal would add another 65,000 jobs statewide. Instead of an additional 65,000 jobs, however, the 125,000 figure from 2011 is still being used, and the 58% recycling rate that presumably supported this number has since dropped to 42%.

More current data on the jobs base in related businesses is illustrated by the number of companies currently engaged in recycling activities and use of recycled material feedstocks within the state. From CalRecycle data,<sup>84</sup> there are 440 businesses in California engaged in some way with the manufacture of recycled content products. Of these, 122 handle plastics. Of the 440, 45 manufacture containers and packaging (primarily related to the beverage container program), and of these, 25 handle plastics.

These numbers, however, are not necessarily complete. Several of the companies listed are engaged in the related collection activities rather than production. A number of the listed web site links are no longer active.

In fact, California was already losing jobs related to its current recycling programs even prior to the onset of the pandemic. Falling global prices for recycled materials combined with rising costs of operating in California forced many private sector recycling centers<sup>85</sup> out of business. A recent

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<sup>82</sup> <https://www.stopplasticpollutionca.com/>, accessed January 21, 2022.

<sup>83</sup> California Raises Recycling Goal To 75%, Biocycle World, October 2011.

<sup>84</sup> CalRecycle, Recycled-Content Product Manufacturers (RCPM), accessed January 12, 2022.

<sup>85</sup> For example, California's Largest Recycling Business Closes all 284 Centers, Lays Off 750, SF Gate, August 6, 2019.

report from Legislative Analysts' Office<sup>86</sup> indicates that 42% (over 1,600) of state convenience zones under the beverage container program are no longer served by a recycling center.

Still, taking the CalRecycle numbers as a base can be used to illustrate the jobs creation potential coming from the measure. The justifications for the new tax in the measure are heavily predicated on the creation of “green jobs” and a “circular economy” through expansion of plastics recycling, reuse of recycled resins, and expanded use of renewable materials in packaging. These are essentially the same economic justifications applied to support the broader shift to waste diversion for all materials encompassed in the state’s solid waste policies since the 1989 Integrated Waste Management Act and individual components such as the 1986 Beverage Container Recycling and Litter Reduction Act (Chapter 1290, Statutes of 1986). California households and businesses currently pay an estimated \$5.6 billion annually in taxes and fees (see Existing Waste Diversion Programs) to support these programs and the circular economy jobs they have created to date.

Yet, after three decades of focused state policy and billions in annual fees and taxes imposed on businesses and households, the CalRecycle numbers indicate that the circular economy component represents just over 3% of current (including materials other than plastic and paper) packaging establishments in the state. All recycled content businesses represent only 0.03% of total nonfarm establishments. This comparison is not to diminish the importance of these jobs to their workers and their communities, but these numbers illustrate the likelihood of significant expansions given the performance of this type of program and expenditure of many tens of billions to date.

This type of jobs creation potential is further diminished by the fact that recycling and related market development is a low priority for expenditure of the taxes raised by the measure. As previously indicated, only about 30% of proceeds from the tax are allocated to plastics recycling (see Proposed Initiative). This share assumes an equal distribution of funds across the several spending pots, and likely will vary considerably over time.

Consequently, primary in-state jobs creation will be the result of spending in state and local government programs, both directly on government functions and subsequently on associated contractors, grantees, and franchisees rather than from the measure’s circular economy goals. These government expenditures will include some increase in waste hauler and sorting jobs directly related to recycling, but the vast majority of these funds will instead be spent by government programs with at best a tangential relationship to recycling.

Still, some additional jobs related to recycling and remanufacturing are likely at some level. A ballpark estimate of jobs directly related to higher plastics recycling can be made using the results from previous studies of the issue by US EPA.<sup>87</sup> Based on 2012 factors, the report estimated a total 28,222 jobs nationally involved in the production of new products from plastics and 4,318 jobs from composting.

These numbers, however, cover both direct and indirect jobs estimated through an input-output model. Adjusting them based on factors from BEA’s input-output model for the US economy and bringing in the tonnage numbers from the EPA report, estimated direct jobs for reprocessing plastics is 7.5 jobs per 1,000 tons, and compost 0.1 job per 1,000 tons. The plastics factor is

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<sup>86</sup> LAO, The 2021-22 Budget: Department of Resources Recycling and Recovery (CalRecycle), February 10, 2021.

<sup>87</sup> US EPA, Recycling Economic Information (REI) Report, November 2020.

generally consistent with the 1,045 jobs noted above for NAICS 325991. These numbers do not include collection jobs, which are included in the indirect jobs component of the original numbers.

Based on the high-end number for both plastics and paper (see Single Use Plastic Packaging in the Waste Stream: California) and incorporating estimates of the amount littered into the ocean (Plastic Pollution), direct jobs created by the measure would be up to 20,000 for plastics and 60 for composting the affected paper assuming existing materials were replaced with bioplastic coated products. However, these numbers overestimate the potential as the waste categories used to calculate the tonnage are broad categories that cover more than the materials that would be subject to the measure.

These numbers also assume there will be markets for this much more recycled plastic. Market demand currently exceeds and likely will continue to exceed supply of high-quality recycled PET and some HDPE. Most other recycled plastic streams, however, support downgraded recycling where the materials are used to make other types of products rather than returned to the original use. There is only so much plastic lumber, buckets, and pails consumers will buy. Advanced recycling would broaden the market potential immediately and set up a true circular economy where materials can be recycled regularly more than once, but the combustion restriction in the measure may limit this option.

Some jobs related to these operations are likely to occur at existing businesses if they are able to expand. New facilities, however, are less likely given existing cost disadvantages to new manufacturing in the state. These competitive factors include the labor and energy cost factors discussed above. Others include:

- The cost and often more critically the time required to complete permit and environmental review approvals for these facilities, is substantially higher than in other states. For example, Tesla's \$1.1 billion factory in Austin neared operation<sup>88</sup> just over a year after it was announced, an expedited schedule the company was also able to use for a similarly large factory in Nevada. If proposed for California, that year would instead have been used to complete applications and scope the CEQA review needed just to begin the overall approval process, not ready a plant to begin producing goods.
- In addition to high regulations, California is also a high tax state. In a comparative study of the states and different facility types, Tax Foundation<sup>89</sup> estimated that the effective tax rate (state and local charges for income and business, property, sales, and unemployment taxes) in California was 18.7% in 2021 for a new labor-intensive manufacturer, and 25.4% for a new capital-intensive manufacturer. These rates were the 6<sup>th</sup> highest in both cases, with states ranging from 2.2% to 22.0% for labor-intensive, and 2.0% to 33.5% for capital-intensive. The state and local taxes are on top of federal taxes.
- As discussed previously, the 25% reduction mandated by 2030 would eliminate a substantial materials flow at the point many businesses should instead be reaching profitable operations. Because this restriction is tied to estimated 2023 use, these limits would apply to an

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<sup>88</sup> New Photos Go Inside Tesla's \$1.1 Billion Austin Factor as It Nears Completion, CultureMap Austin, October 22, 2021.

<sup>89</sup> Tax Foundation, Location Matters 2021: The State Costs of Doing Business, May 5, 2021.

increasing share of goods sold in the state over time, shrinking market potential even further. Investors clamor to get into growing markets, not ones that will be constrained artificially over time. The measure is internally inconsistent with its circular economy goals.

The effect on in-state jobs will become even less pronounced in the event subsequent regulations instead focus on promoting use of renewables in packaging production. As previously discussed (see *Plastics from Renewables*), bioplastics production is currently slated to be heavily concentrated in Asia (70.8% of global production in 2026) and to a lesser extent Europe (16.9%) as the result of the EU Plastics Strategy adopted in 2018 and subsequent actions.

Production of these products in Asia—bioplastics as well as many pulp alternatives—is also likely necessary at least for a sustained period in order to result in prices that while still higher are more competitive with traditional plastics due to lower labor, energy, and other operating costs. As one indicator of this factor, a review of “eco-friendly” products at Webstaraunt Store (a leading on-line distributor of restaurant supply products) indicates that 26% to 100% of biodegradable and renewables foodware offerings are sourced as imports, with overall two-thirds of these products coming from imports.

### Eco-Friendly Single Use Foodware by Production Source

*Source: www.webstaurantstore.com, accessed 12/30/21*

<i>Product Category</i>	<i>Imported Share of Products</i>
Eco-Friendly Take-Out Containers	26%
Environmentally Friendly Drink & Cup Carriers	33%
Eco-Friendly Disposable Cups	43%
Eco-Friendly To-Go Containers	56%
Biodegradable, Compostable Trays	56%
Biodegradable, Compostable Straws	59%
Biodegradable, Compostable Compartment Trays	62%
Biodegradable, Compostable Bowls	85%
Biodegradable, Compostable Plates	89%
Biodegradable & Compostable Cutlery	89%
Eco-Friendly, Biodegradable Paper Hot Cups and Lids	91%
Green/Environmentally Friendly Coffee Stirrers	100%
<i>All Products</i>	<i>68%</i>

Note these numbers count the number of products, not overall sales volume for each one. However, they indicate the extent to which current economics favor production of these foodware products overseas, a factor which will be even more controlling in consideration of California’s higher costs.

Net jobs effects will instead likely be dominated by the effects of higher prices that will be faced by households in consuming fundamentally the same goods. Using the standard assumption that all other factors remain equal, under current costs, the measure would result in a net decrease in household consumption as discretionary incomes are allocated to higher prices rather than equal or higher consumption, especially when taking into consideration the more speculative effects arising from the mandated 25% reduction in use of the affected items by 2030. The net change in direct and indirect jobs will depend on the extent to which sourcing shifts to suppliers outside the state, likely shifting from in-state production to smaller jobs expansion within wholesale trade as out of

state sourcing increases. The induced effects coming from further reductions in real disposable incomes, however, are likely to be the controlling factor in the total net outcomes.

## Appendix: Abbreviations

### Plastic Resins (by resin number):

1. PET or PETE (Polyethylene terephthalate)
2. HDPE (High density polyethylene)
3. PVC (Polyvinyl chloride)
4. LDPE (Low density polyethylene)
5. PP (Polypropylene)
6. PS (Polystyrene)
7. Other, including mixed plastics

### Bio & Other Plastics

PA	polyamide
PBAT	polybutylene adipate-co-terephthalate
PBS	polybutylene succinate
PCL	polycaprolactone
PEF	polyethylene fuanorate
PHA	polyhydroxyalkanoate
PHB	polyhydroxybutyrate
PLA	polylactic acid
PTT	polytrimethylene terephthalate

### Agencies

BEA	US Bureau of Economic Analysis
BLS	US Bureau of Labor Statistics
CalRecycle	California Department of Resources Recycling & Recovery
EDD	California Employment & Development Department
FDA	US Food & Drug Administration
FTC	US Federal Trade Commission
LAO	California Legislative Analysts' Office
US EPA	US Environmental Protection Agency

### Other

CEQA	California Environmental Quality Act
CRV	California Refund Value
EPS	expanded polystyrene foam
ESG	environmental, social, and governance
GDP	gross domestic product
MSW	municipal solid waste
NAICS	North American Industry Classification System
NFIB	National Federation of Independent Businesses
RPPC	Rigid Plastic Packaging Container