EXECUTIVE OFFICE
BOARD OF SUPERVISORS
CELIA ZAVALA
EXECUTIVE OFFICER

COUNTY OF LOS ANGELES
EXECUTIVE OFFICE
BOARD OF SUPERVISORS
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ADOPTED
BOARD OF SUPERVISORS
COUNTY OF LOS ANGELES
36 April 5, 2022
CELIA ZAVALA
EXECUTIVE OFFICER

April 05, 2022

The Honorable Board of Supervisors
County of Los Angeles
383 Kenneth Hahn Hall of Administration
500 West Temple Street
Los Angeles, California 90012

Dear Supervisors:

REDUCTION OF WASTE FROM SINGLE-USE ARTICLES AND EXPANDED POLYSTYRENE PRODUCTS ORDINANCE
ALL DISTRICTS (3-VOTES)

SUBJECT

As directed by the Board of Supervisors (Board) motion (Kuehl-Hahn; Item No. 8, Agenda of October 15, 2019), the Chief Sustainability Office (CSO), in coordination with County Counsel and the Departments of Public Works (DPW), Public Health (DPH), and Consumer and Business Affairs (DCBA), has developed an ordinance to reduce the use of single-use plastics in the unincorporated areas. This ordinance amends Title 12 – Environmental Protection – Chapter 12.86, of the Los Angeles County Code, relating to "Single-Use Accessories Upon Request," and renames it "Reduction of Waste from Single-Use Articles and Expanded Polystyrene Products."

IT IS RECOMMENDED THAT THE BOARD:

1) Adopt the attached California Environmental Quality Act (CEQA) Findings which conclude that the adoption of the Reduction of Waste from Single-Use Articles and Expanded Polystyrene Products ordinance is exempt from the CEQA under Sections 15307, 15308, 15378 and 15060(c)(2) of the State CEQA Guidelines, for the reasons stated in this Board letter, the attached findings, and the record of the project.

2) Introduce, waive reading, and place on a future agenda for adoption the Reduction of Waste from Single-Use Articles and Expanded Polystyrene Products ordinance.

PURPOSE/JUSTIFICATION OF RECOMMENDED ACTION

A significant amount of waste is generated in Los Angeles County (County) from single-use plastic products, particularly food service ware. This problem was exacerbated during the COVID-19 pandemic as a result of increased use of food delivery services. These products pose a burden to County residents as they both accumulate in landfills and, when improperly disposed of as litter, end up in streets and waterways. The County spends millions of dollars annually addressing litter through infrastructure investments and outreach and education. In addition, global shifts in recycling markets have made it increasingly difficult to recycle many types of plastic waste such that in California, at least 85% of single use plastic is not recycled. Plastic food service ware, in particular, is rarely if ever recycled as a result of the small size of items and the presence of food residue contamination.

In light of these challenges, in October 2019, the Board adopted a motion titled “Limiting Single-Use Plastics in Los Angeles County Unincorporated Areas” (Motion). The Motion directed the CSO, in coordination with DPW, DPH, DCBA, and County Counsel to: 1) contract with UCLA’s Luskin Center to complete a report on management of single use plastic food service ware in the County, and 2) use the results of the UCLA report to inform and engage stakeholders and to draft a recommended ordinance for consideration by the Board that would reduce the use of single-use plastics in unincorporated portions of the County. Specifically, the Motion noted that the ordinance should reduce or eliminate the use of single-use plastic food service ware and ensure that materials used for disposable products are actually recyclable in practice, or compostable.

This ordinance (see Attachment I) would follow earlier steps the Board has taken to address plastic waste, including the Carryout Bag Ordinance adopted in November 2010, the Single Use Accessories Upon Request Ordinance adopted on June 8, 2021, and the Reducing Single Use Plastics in County Facilities Board Policy adopted on November 16, 2021.

Implementation of Strategic Plan Goals

The recommended action helps effectuate the County’s Strategic Plan Goal II - Foster Vibrant and Resilient Communities, specifically, Strategy II.3 - Make Environmental Sustainability Our Daily Reality, and Strategy II.3.4, Reduce Waste Generation and Recycle and Reuse Waste Resources. Additionally, it carries out Action 107 of the OurCounty Sustainability Plan as adopted by the Board on August 6, 2019, that specifically directs the phase out of single-use plastics. Adoption of the ordinance is also consistent with the County’s Roadmap to a Sustainable Waste Management Future.

FISCAL IMPACT/FINANCING

There will be no impact to the County General Fund by adopting the ordinance, though the County may choose to fund activities related to implementation of the ordinance, such as education, outreach, and technical assistance. In addition, beginning
May 1, 2023, the ordinance allows for the imposition of fines up to $100 for each day of violation, up to a maximum fine of $1000 per year on facilities that violate the ordinance.

There may be a cost to businesses to transition to the materials required by the ordinance; however, the amount will vary from business to business based on a number of factors, including what materials they currently use, what materials they decide to switch to, their individual contracts with product suppliers, and how much of their business requires use of disposable materials. The ordinance includes provisions to grant economic hardship waivers to businesses on a case-by-case

basis.

FACTS AND PROVISIONS/LEGAL REQUIREMENTS

As directed by the Motion, the CSO contracted with UCLA's Luskin Center to evaluate issues related to single-use plastic food service ware in the County (see Attachment II). The report included a comparison of environmental and economic impacts from single- use plastic items to those from reusable or compostable alternatives, and documentation of de facto waste management practices at local waste facilities. The report was based on literature reviews, as well as interviews of local waste operators and other jurisdictions which have adopted limitations on single-use plastics. In addition to the original report, which was released in January 2020, UCLA provided the County with an update to the report in October 2021 (see Attachment III) to reflect changes in the waste management landscape resulting from the COVID-19 pandemic.

Some of the key findings from the report included that plastic food service ware, regardless of resin type, is generally not recycled at all in the County as a result of the small size of items and food residue contamination. The report found that expanded polystyrene (e.g. foam) is particularly problematic to manage as a result of its material properties, which also make it economically impractical to recycle. In addition, the report found that certain compostable products, in particular those that are fiber-based and do not contain fluorinated compounds, can be environmentally preferential as compared to single-use plastic products.

The proposed ordinance prohibits food facilities, such as restaurants, bars, supermarkets and other businesses from providing ready-to-eat food to customers with single-use food service ware unless it is actually recyclable or compostable, and provides that compostable products must be fiber-based unless there are no fiber-based options available for the specific food service application. It also prohibits retail establishments from selling products made from polystyrene, and it requires full-service restaurants to use reusable food service ware.
The CSO engaged stakeholders to support development of the draft ordinance language through workshops prior to drafting of ordinance language, numerous individual meetings, as well as listening sessions where draft provisions were presented. Stakeholders included representatives from environmental and environmental justice organizations, the plastics industry, the restaurant industry, the waste industry, other business interests, community organizations, academic institutions, and local jurisdictions. A detailed summary of the ordinance's draft provisions was sent to stakeholders in January 2022, with a request to submit any written comments by mid-February. Written comments were summarized in a table along with staff responses (see Attachment IV). The CSO posted this summary on our website and informed stakeholders that it was available. In addition to the workshops, individual meetings, and listening sessions, the CSO also hired a contractor to engage restaurants in unincorporated areas. In these discussions, the contractor informed restaurants of the draft ordinance and gathered information on their current operating practices, including what food service ware materials they currently use, and what barriers they expected to face in switching to alternative materials.

Based on this engagement process, the ordinance contains several provisions to provide flexibility for businesses that are subject to its provisions, including delaying implementation for at least one year to provide businesses with time to learn about its provisions, exhaust existing supplies, and implement the new requirements. Additionally, the ordinance includes both exemptions for specified sectors and a waiver process for economic or other hardships, and it authorizes the Director of DPW to approve the use of alternative products when recyclable or fiber-based compostable products are not readily available. Finally, enforcement of the ordinance will focus on education in the early stages

rather than be punitive. The final ordinance language was posted on the CSO website on March 25, 2022, prior to the Board hearing, and stakeholders were informed via e-mail of its availability.

ENVIRONMENTAL DOCUMENTATION

The proposed ordinance is within a class of products that are exempt from CEQA in that it meets the criteria set forth in sections 15307 and 15308 of the State CEQA Guidelines. Specifically, adoption of the proposed ordinance is an action taken by the County in a regulatory capacity to provide for the maintenance, protection and/or enhancement of natural resources and the environment, and it contains procedures for the protection of the environment. By prohibiting food facilities from providing ready-to-eat food to customers with disposable food service ware items unless they are recyclable or disposable, requiring full service restaurants to use reusable food service ware for dine-in customers, and prohibiting retail establishments from selling goods made from polystyrene, the ordinance will reduce the amount of polystyrene and other plastic that enters the environment, fills up landfills, harms marine environments, and impacts human health.

In addition, based upon the proposed project records, none of the conditions that would make these exemptions inapplicable under Section 15300.2 of the CEQA Guidelines is present.

The proposed ordinance is also exempt from CEQA pursuant to Sections 15378 and 15060(c)(2) of the CEQA guidelines because it will not result in a direct or reasonably foreseeable indirect physical change in the environment.

Attachment V sets forth findings in support of these categorical exemptions for the Board's consideration and adoption.

Upon the introduction of the ordinance before the Board and adoption of the findings set forth in Attachment V, the Chief Sustainability Officer will file a notice of exemption with the County Registrar-Recorder/County Clerk and with the State Clearinghouse.

IMPACT ON CURRENT SERVICES (OR PROJECTS)

The proposed ordinance will support County efforts to address litter in our communities and waterways, help achieve surface water quality standards, and serve the County goals for waste reduction and the Board adopted priority of sustainability. Reduction of single use plastics is a priority action in the Board adopted OurCounty Sustainability Plan. As noted above, the CSO engaged stakeholders throughout the ordinance development process through workshops, listening sessions, individual meetings, and restaurant surveys.

We expect that engagement and outreach will continue after the ordinance adoption to ensure that businesses and residents are aware of the ordinance requirements and to provide guidance and support on achieving compliance with them.

CONCLUSION

Given the significant economic costs and environmental impacts on our communities from plastic

waste and the burden that such material places on the County's waste management system, adoption of this ordinance would provide immediate and long-term benefits for the County.

Respectfully submitted,

CELIA ZAVALA

Executive Officer, Board of Supervisors

CZ:JL:GG:jg

Enclosures

c: County Counsel
Consumer and Business Affairs
Public Health
Public Works

ANALYSIS

This ordinance amends Title 12 – Environmental Protection, Chapter 12.86 – Single-Use Foodware Accessories Upon Request – of the Los Angeles County Code, and renames it "Reduction of Waste from Single-Use Articles and Expanded Polystyrene Products." This ordinance applies to food facilities and retail establishments that are located within the unincorporated area of the County, as well as to food facilities located within County facilities. It requires that single-use articles that food facilities provide to customers with ready-to-eat food, such as food containers, cups, dishes and accessories, be either compostable or recyclable. The ordinance includes exemptions from this requirement involving single-use articles for food that is: prepared and packaged outside of the unincorporated area of the County; provided in connection with a declared emergency; or provided to patients at hospitals and other health facilities. The Director of Public Works may also approve the use of specific single-use articles that are not compostable or recyclable when there are no compostable or recyclable alternatives available for a specific food-service application.

In addition, this ordinance:

- Prohibits the retail sale of products made from expanded polystyrene (also known as "Styrofoam"), such as coolers, packaging materials, single-use articles such as cups, plates, and similar items, and pool toys, unless the products are encased in a durable material.
- Requires full-service restaurants to use multiservice utensils (i.e., reusable foodware) for dine-in customers.

This ordinance also provides a process for businesses to obtain hardship waivers. A violation by a food facility or retail establishment may be punishable by a fine of up to one hundred dollars ($100) for each day of a violation, up to a maximum fine of one thousand dollars ($1,000) per year.

Most provisions of this ordinance will become effective on the following schedule: (1) May 1, 2023, for food facilities operating in a permanent location and for all retail establishments; (2) November 1, 2023, for food trucks; and (3) May 1, 2024, for certified farmers' markets, temporary food facilities, and catering operations.

RODRIGO A. CASTRO-SILVA
County Counsel

By Julia C. Weissman
JULIA C. WEISSMAN
Senior Deputy County Counsel
Public Works Division

JCW:mv

Requested: 2/18/2022
Revised: 3/14/2022

ORDINANCE NO._____

An ordinance amending Title 12 – Environmental Protection, Chapter 12.86 – Single-Use Foodware Accessories Upon Request – of the Los Angeles County Code, to rename it "Reduction of Waste from Single-Use Articles and Expanded Polystyrene Products," and to: request that single-use articles provided by food facilities that serve ready-to-eat food to customers be either compostable or recyclable; require that full-service restaurants use reusable foodware when serving food to dine-in customers; and prohibit retail establishments from selling products made of expanded polystyrene.

The Board of Supervisors of the County of Los Angeles ordains as follows:

SECTION 1. Section 12.86.005 is hereby amended to read as follows:

12.86.005 Findings.

A. ~~Single-use foodware accessories, including straws, cutlery, chopsticks, condiment packets, cup lids, stirrers, spill plugs, napkins, and hot beverage sleeves are rarely recycled for a variety of reasons, including because of their small size, lack of content-labeling, and concerns with potential food contamination. As a result, they significantly contribute to waste in landfills and often end up as litter~~Single-use disposable food service ware, including plates, cutlery, cups, lids, straws, "clamshells" and other food containers, contribute in a significant way to the waste that is disposed in landfills and that litters the environment.

B. ~~Single-use foodware accessories made of plastic are especially bad for the environment. They do not biodegrade, and they have a lifespan that likely lasts centuries. Plastics create an intractable waste-management problem as plastic~~

~~accumulates in perpetuity in landfills and as litter on streets, infiltrating public drainage systems and accumulating in waterways~~Single-use articles and expanded polystyrene products are rarely recycled and may, in fact, contaminate otherwise recoverable waste streams. Because single-use articles and products made from expanded polystyrene are extremely lightweight, they are very susceptible to blowing away, and they frequently become litter that pollutes waterways and oceans.

C. Products made from expanded polystyrene and other types of plastic are especially damaging to the environment when they are discarded. They do not biodegrade, and they can remain in the environment for centuries. Not only does plastic waste accumulate in perpetuity in landfills, but when plastic waste becomes litter, it can also infiltrate public drainage systems and accumulate in our waterways.

D. In waterways and oceans, plastics break down into smaller pieces known as "microplastics," which are present in most of the world's oceans. More than eight million tons of plastic enter the oceans each year. The harm that plastic waste causes to the environment and to wildlife in particular is now well-documented. Based on current levels of discarded plastic, one study estimated that by 2050, there would be more plastic, by weight, in the ocean than fish.

E. In addition, local jurisdictions incur significant expenses to address the pollution that results when plastic litter makes its way into local waterways, in order to comply with State- and federally-imposed water quality standards, and they may be subject to liability and fines for failure to meet those standards.

F. There are also significant questions regarding the potential impacts of plastics in the environment on human health. Microplastics have been discovered in a range of foods and beverages consumed by people, including bottled water, beer, salt, seafood, and honey. As a relatively novel problem, the actual health impacts of this exposure are not yet well-understood, but researchers have raised concerns about a variety of potential impacts, particularly to the immune system.

G. In addition, China has implemented its "National Sword" policy to limit the types and quality of imported waste material that China will accept for recycling, and other countries have followed suit. This has disrupted the market for recyclable material, imposed additional costs on local jurisdictions' recycling programs, and also called attention to the fact that many of the materials that the public has been told are being recycled are actually being landfilled or dumped.

H. Restricting the use of single-use plastic foodware and expanded polystyrene products will reduce the environmental impacts of those products.

I. From an environmental standpoint, the best alternative to single-use plastic foodware is to use reusable foodware. However, due to limitations on space and dishwashing capacity, it may not be feasible at this time to require food facilities, other than full service restaurants, to use reusable foodware. Nor is it feasible at this time to require the use of reusable foodware for take-out and delivery orders. However, requiring food facilities to use single-use foodware articles that are compostable or recyclable, in place of single-use plastic articles, will have a beneficial effect on the

environment by reducing the impacts associated with the manufacture and disposal of single-use plastic.

J. Cost-effective, reusable,and compostable foodware products are readily available for most food-service applications and are less toxic and more environmentally friendly than polystyrene or other plastics. Moreover, while most types of single-use articles are rarely recycled, there are some products, such as those made of aluminum, that are more likely to be recycled.

~~C~~K. Food facilities often automatically provide single-use foodware accessories to customers who may not want or need them, particularly when customers purchase food for take-out or delivery to be consumed in their homes.

~~D~~L. Limiting the distribution of unwanted single-use foodware accessories by requiring food facilities to provide them only upon the request of a customer, and by requiring third-party, online food-ordering businesses to provide options for customers to select only those items they want, is a straightforward solution to reduce waste consisting of unused single-use foodware accessories, and will also result in cost savings to businesses.

SECTION 2. Section 12.86.010 is hereby amended to read as follows:

12.86.010 Definitions.

The following definitions apply to this Chapter:

A. "Compostable" means consisting entirely of material that will promptly and safely break down into, or otherwise become part of, usable compost. For purposes of

this Chapter, in order to be considered "compostable," a product must, at a minimum, conform to the following requirements:

1. It must be free of all intentionally added fluorinated chemicals, including, but not limited to, per- and polyfluoroalkyl substances (PFAS); and

2. It must satisfy one or more of the following additional requirements:

a. It must be certified as "home compostable" by a certifying organization acceptable to the Director of Public Works. "Home compostable" means that the material will biodegrade at moderate temperatures in a composting bin designed for home use;

b. It must be certified by its manufacturer to be composed solely of fiber-based material, such as paper or wood, without any coatings or additives that are not made entirely from fiber-based material; or

c. It must accommodate a specific food service application for which the Director of Public Works has determined that no single-use article that complies with subsection 2.a or 2.b of this definition is readily available, and it must have been certified as compostable by both the Biodegradable Products Institute ("BPI") and the Compost Manufacturing Alliance ("CMA").

The Director of Public Works may impose additional requirements to mandate that products considered "compostable" are certified to biodegrade in less than ninety (90) days or are certified compostable in home or community composter settings, to the extent that the Director of Public Works determines that organizations exist that can reliably provide such certification and that products are readily available that have

received such certification. In addition, if the Director of Public Works determines that certification agencies other than CMA and BPI can provide certifications that are equivalent to those provided by CMA and BPI, the Director of Public Works is authorized to designate products as "compostable," under subsection 2.c of this definition, that have been certified compostable by such other certification organizations.

In accordance with Section 12.86.070.B of this Chapter, the Director of Public Works may issue rules and guidelines that set forth requirements for products to be considered "compostable" in accordance with this definition and identify specific products and categories of products that are, and are not, considered "compostable" for purposes of this definition.

~~A~~B. "Condiment" has the meaning set forth in California Health and Safety Code section 113756; it includes such foods as ketchup, mustard, mayonnaise, sauerkraut, soy sauce, salsa, syrup, jam, jelly, salt, sugar, sugar substitute, cream, coffee creamer, pepper, chili-pepper or cheese topping. "Condiment" does not include an ingredient or component of a ready-to-eat food item that constitutes an integral part of that item even if such integral ingredient or component is packaged separately from the ready-to-eat food item.

~~B~~C. "County" means the County of Los Angeles.

~~C~~D. "County facility" means any building, structure, property, park or open space, that is owned, operated, managed or leased by the County for the purpose of providing County services or conducting County business.

~~D~~E. "Customer" means any natural person or such person's agent or caregiver.

F. "Egg carton" means a container commonly used to package raw eggs sold to retail customers.

G. "Expanded polystyrene" means polystyrene that has been expanded or "blown," using a gaseous blowing agent, into a solid foam, and is sometimes known by the trade-name Styrofoam.

H. "Expanded polystyrene product" means a product made from expanded polystyrene, and includes, without limitation, such products as coolers, ice chests, cups, bowls, plates, shipping boxes, packing peanuts, packing materials, and pool or beach toys, that are made from expanded polystyrene. Expanded polystyrene products do not include products such as surfboards, coolers, and craft supplies that are wholly encapsulated or encased in a more durable material. Nor do expanded polystyrene products include products that are pre-packaged outside of the unincorporated area of the County using expanded polystyrene as part of the packaging material, as long as the products themselves are not made of expanded polystyrene that is not encased in a more durable material.

~~E~~I. "Food facility" has the meaning set forth in California Health and Safety Code section 113789; it includes restaurants, bars, coffee shops, fast food restaurants, food carts, grocery stores, supermarkets, convenience stores, school cafeterias, hospitals and nursing facilities, snack bars, food trucks, juice bars, farmers markets, and temporary food facilities, such as those participating in fairs or events. "Food facility"

does not include a third-party, online food-ordering business. For purposes of this Chapter, the term "food facility" includes only businesses that are located, or that operate, within the unincorporated area of the County, or that operate within a County facility.

For purposes of Section 12.86.015.G of this Chapter, food facilities are divided into the following categories:

1. "Category 1 food facility" means any food facility not included within the definition of a category 2 or category 3 food facility;

2. "Category 2 food facility" means a mobile food facility, excluding street-food vendors; and

3. "Category 3 food facility" means a certified farmers' market as defined in California Health and Safety Code section 113742, a temporary food facility, or a catering operation as defined in Health and Safety Code section 113739.1.

J. "Food tray" means a tray commonly used for packaging raw, uncooked food sold to retail customers, such as meat, fish, and whole fruits and vegetables.

K. "Full service restaurant" means a restaurant where food may be consumed on the premises, and where each of the following would typically occur when a customer consumes food on the premises:

1. The customer is escorted or directed to an assigned eating area. An employee of the restaurant may choose the assigned eating area or may seat the customer according to the customer's need for accommodation or other request;

2. Except for food that is included in a buffet or salad bar, the customer's food and beverage orders are delivered directly to the customer; and

3. If a customer wants additional items with the customer's food or beverage order, the customer requests such items from the server, and the server brings the requested items to the customer.

~~F~~L. "Grocery store" has the meaning set forth in California Health and Safety Code section 113948(c)(3); it means a store primarily engaged in the retail sale of canned foods, dry goods, fresh fruits and vegetables, and fresh meats, fish, and poultry, and any area within the store~~,~~ (that is not separately owned or operated~~,~~) where food is prepared or sold, including a bakery, deli, and meat and seafood counter.

M. "Health facility" has the meaning set forth in California Health and Safety Code section 1250; it means a facility for the care, treatment, and diagnosis of human illness to which persons are admitted for a 24-hour stay or longer, including, among other facilities, acute care hospitals, psychiatric hospitals, skilled and intermediate nursing facilities, and rehabilitation facilities.

N. "Mobile food facility" has the meaning set forth in California Health and Safety Code section 113831; it means a vehicle, such as a food truck, that is used in conjunction with a commissary or other permanent food facility upon which food is sold or distributed at retail.

O. "Multiservice utensil" has the meaning set forth in California Health and Safety Code section 113837; it includes foodware used for serving and consuming ready-to-eat food, including, but not limited to, plates, bowls, trays, condiment

containers, cups, or drink ware, and accessories, such as cutlery, that is manufactured from durable materials and that is specifically designed to be cleaned after each use and reused.

~~G~~P. "Online food-ordering platform" means the digital technology provided on a website or mobile application through which a customer can place an order for pick-up or delivery of ready-to-eat food. Online food-ordering platforms include such platforms: operated directly by food facilities; operated by third-parties that place ~~take-out~~ready-to-eat food orders with food facilities on behalf of customers and then deliver the food; and operated by third-parties that place orders with food facilities on behalf of customers without providing delivery service.

~~H~~Q. "Person" means any natural person, firm, corporation, partnership, limited liability company, or other organization or group, however organized.

R. "Plastic" has the meaning set forth in California Public Resources Code section 43732; it means any synthetic material made from organic polymers, such as polyethylene, polyvinyl chloride, or nylon, that can be molded into shape while soft and then set into a rigid or slightly elastic form. "Plastic" includes all materials identified with, or conforming to, resin codes 1 to 7, inclusive, as provided in California Public Resources Code section 18015, without regard to whether such material displays a resin code.

S. "Polystyrene" means a thermoplastic petrochemical material utilizing the styrene monomer, including, but not limited to, expanded polystyrene, processed by any number of techniques, including, but not limited to, fusion of polymer spheres

(expandable bead polystyrene), injection molding, foam molding, or extrusion-blow molding (extruded foam polystyrene), and clear or solid polystyrene (oriented polystyrene). This definition applies to material made with polystyrene, regardless of whether it exhibits a label or code identifying it as polystyrene.

~~I~~T. "Ready-to-eat-food" has the meaning set forth in California Health and Safety Code section 113881; it includes food~~, including~~and beverages that may be consumed without additional preparation to achieve food safety.

U. "Recyclable" means capable of being source-separated or otherwise removed from the waste stream when discarded, and then feasibly recycled, salvaged, processed, or marketed by any means other than landfilling or burning, and returned to use by society, irrespective of whether it is compostable. For single-use articles to be considered recyclable, it is necessary that recycling, salvage, or processing facilities be readily available, and they must have the technical and operational ability, as well as adequate capacity, to receive, recycle, salvage and/or process the material from which such single-use article is composed, and there must be a market for such recycled, salvaged, or processed material. For purposes of this Chapter, in no event shall single-use articles made with plastic be considered recyclable. In accordance with Section 12.86.070.B of this Chapter, the Director of Public Works shall issue rules and guidelines to identify which products, categories of products, and types of material are, and are not, considered "recyclable" in accordance with this definition.

V. "Retail establishment" means any commercial establishment located within the unincorporated area of the County that sells goods directly to customers primarily for their own consumption or use.

~~J~~W. "Self-serve dispenser or station" means any type of dispenser, container, counter, shelf, or other location that is accessible to customers of a food facility at which such customers can independently access single-use foodware accessories.

~~K~~X. "Single-use," in referring to a foodware accessory item, means that the item has been designed and constructed for one-time, one-person use, after which the item is meant to be discarded.

Y. "Single-use article" means an item of food-service ware within the meaning of California Health and Safety Code section 113914, that is intended for a single-use, and that is used for serving, consuming, transporting, or containing food and beverages, including, but not limited to, clamshells, pizza boxes, plates, bowls, trays, wrappers, cups, straws, stirrers, knives, forks, spoons, and lids. "Single-use articles" include food trays and egg cartons. "Single-use article" does not include beverage containers that are subject to the California Redemption Value ("CRV") in accordance with the California Beverage Container Recycling and Litter Reduction Act, Public Resources Code section 14500, et seq. In addition, for purposes of this Chapter, "single-use article" does not include items, such as ketchup bottles and pickle barrels, that are not intended for a single-use but that would nevertheless be considered "single-use articles" under California Health and Safety Code section 113914 because they do not meet specified materials, durability, strength, and cleanability specifications.

~~L~~Z. "Single-use foodware accessory" means a single-use ~~foodware item~~article that is provided alongside or with ready-to-eat food, including straws, stirrers, knives, forks, spoons, chopsticks, condiment packets, condiment containers, napkins, cup lids, spill plugs, and hot beverage sleeves. "Single-use foodware accessory" does not include plates, cups, bowls, containers, wrappers, bags or other single-use ~~foodware~~articles that ~~is~~are used for holding or containing ready-to-eat food while it is being delivered, transported, or consumed.

~~M. "Single-use plastic stirrer" means a foodware accessory item that is used to mix beverages, that is intended only for single-use, and that is made predominantly of plastic derived from either petroleum or a biologically-based polymer, such as corn or other plant sources. "Single-use plastic stirrer" includes compostable and biodegradable petroleum or biologically-based polymer stirrers, but does not include stirrers that are made from non-plastic materials, such as paper, sugar cane, bamboo, etc.~~

~~N. "Single-use plastic straw" means a tube that allows an individual, through suction, to transfer a beverage, liquid, or semi-frozen liquid from its container into the individual's mouth, that is intended only for single-use, and that is made predominantly of plastic derived from either petroleum or a biologically-based polymer, such as corn or other plant sources. "Single-use plastic straw" includes compostable and biodegradable petroleum or biologically-based polymer straws, but does not include straws that are made from non-plastic materials, such as paper, sugar cane, bamboo, etc.~~

AA. "Street food vendor" means a mobile food facility that has all of the following characteristics: (1) the vehicle from which the vendor sells food is not

enclosed; (2) the vehicle from which the vendor sells food is nonmotorized; and (3) the vendor operates upon a public sidewalk or other pedestrian path.

BB. "Take-out food" means ready-to-eat food that a customer purchases from a food facility for consumption outside of the premises of the food facility.

~~O~~CC. "Temporary food facility" means a temporary food facility, as defined in California Health and Safety Code section 113930, ~~which~~that is approved by the County Health Officer and operates at an approved community event.

~~P~~DD. "Third-party, online food-ordering business" means a person that is not a food facility and that operates an online food-ordering platform for customers to order, for take-out or delivery, ready-to-eat food that is prepared or sold by food facilities.

SECTION 3. Section 12.86.015 is hereby added to read as follows:

12.86.015 Prohibiting Distribution and Sale of Single-Use Articles That Are Neither Compostable Nor Recyclable.

A. Except as provided in subsections B and C of this Section and as otherwise provided in this Chapter:

1. A food facility shall not provide any single-use article with ready-to-eat food that it offers to a customer unless such single-use article is either compostable or recyclable; and

2. A food facility shall not provide a food tray or egg carton with any food that it offers to a retail customer unless such food tray or egg carton is either compostable or recyclable.

B. The requirements of this Section 12.86.015 do not apply to single-use articles that are included with ready-to-eat food that is pre-packaged at a location that is outside of the premises of the food facility, provided that such ready-to-eat food is offered to the customer as originally packaged. Except as otherwise provided in this Chapter, if a food facility adds any single-use articles when providing such pre-packaged food to a customer, such additional single-use articles shall comply with subsection A, above.

C. The Director of Public Works may authorize the use of specific categories or types of single-use articles that are not compostable or recyclable in accordance with Sections 12.86.010.A or 12.86.010.U of this Chapter if the Director of Public Works determines that there is a specific food service application for which no compostable or recyclable single-use product can feasibly be used. For purposes of this Section, a compostable or recyclable product can feasibly be used for a particular food-service application only if, in the determination of the Director of Public Works, such product is: (a) readily available; and (b) can effectively be used for the particular application. In no event, however, shall the Director of Public Works approve the use of a product that is made from expanded polystyrene. The Director of Public Works may also authorize the use of a non-compostable plastic single-use article product that would not be considered recyclable under Section 12.86.010.U if the Director of Public Works determines, based upon developments in recycling technology and infrastructure, that such product is feasibly recyclable.

D. The Director of Public Works shall identify, in the rules and guidelines adopted in accordance with Section 12.86.070.B of this Chapter, any non-compostable, non-recyclable single-use articles that food facilities are authorized to use in accordance with subsection C, above, as well as any products that the Director of Public Works approves as compostable under Section 12.86.010.A.3.

E. The Director of Public Works may rescind any approval of any non-compostable and non-recyclable single-use article product that was granted in accordance with subsection C of this Section, or in accordance with Section 12.86.010.A.2. If the Director of Public Works rescinds any such authorization or determination, the Director of Public Works shall update the rules and guidelines accordingly. Any revision to the rules and guidelines rescinding an authorization to use a single-use article that is not compostable or recyclable shall not become effective until one year after the date that the Director of Public Works submits it to the Los Angeles County Board of Supervisors in accordance with Section 12.86.070.B.

F. Street food vendors are not required to comply with this Section 12.86.015.

G. The requirements of this Section 12.86.015 shall become effective on the following dates for the following categories of food facilities:

1. On May 1, 2023, for category 1 food facilities;

2. On November 1, 2023, for category 2 food facilities; and

3. On May 1, 2024, for category 3 food facilities.

SECTION 4. Section 12.86.020 is hereby amended to read as follows:

12.86.020 Single-Use Foodware Accessories Provided Only Upon Request by Customer.

~~The following requirements apply to food facilities that are located in the unincorporated area of the County or that are operated within a County facility:~~

A. No food facility may automatically provide single-use foodware accessories to any customers with their order of ready-to-eat food. Food facilities may provide single-use foodware accessories to customers with their order of ready-to-eat food only if the customers request that they be provided such accessories, and only if such single-use foodware accessories comply with Section 12.86.015 of this Chapter.

B. Nothing in this Chapter prohibits a food facility that is providing ready-to-eat food to customers from asking the customers if they would like to be provided any single-use foodware accessories that the food facility makes available for customers. This Chapter does not prohibit a food facility from making available to customers single-use foodware accessories from a self-serve dispenser or station, with the exception of single-use plastic straws and single-use plastic stirrers. Food facilities are prohibited from making single-use plastic straws and single-use plastic stirrers available to customers from a self-serve dispenser or station. Single-use foodware accessories, however, shall not be bundled or packaged in a manner that prohibits a customer from taking only the type of single-use foodware accessory, if any, that may be desired without also having to take a different type of single-use foodware accessory. Nothing in this Chapter prohibits a food facility from providing to customers single-use foodware

accessories that are included as part of a product that is pre-packaged by a manufacturer, such as a juice box or pre-packaged salad.

C. A food facility that operates an online food-ordering platform for its customers to order ready-to-eat food for delivery or take-out ~~may~~shall, if it offers single-use foodware accessories to its customers, provide options on such platform to enable customers to select which of available single-use foodware accessories, if any, the customers ~~may~~ chooses to have included with their order. Food facilities shall not provide any single-use foodware accessories to customers that order ready-to-eat food through their own online food-ordering platform unless those customers have requested such accessories, either through the online food-ordering platform or in person when picking up their order.

D. If a food facility uses any third-party, online food-ordering business for ready-to-eat food, the food facility shall customize its menu with a list of available single-use foodware accessories. A food facility that prepares orders of ready-to-eat food for customers who have placed those orders through third-party, online food-ordering businesses shall not provide any single-use foodware accessories with the orders unless the customers have selected such single-use foodware accessories through options provided on the online food-ordering platform, in accordance with Section 12.86.025, or the customers have requested such accessories in person when picking up their order.

E. Nothing in this Chapter shall be construed to require food facilities to provide single-use foodware accessories to customers ordering ready-to-eat food.

F. Notwithstanding any other provision of this Chapter, food facilities may include single-use cup lids, spill plugs, and hot beverage sleeves with drive-thru and delivery orders of ready-to-eat food orders that include beverages, without a customer request, for safety reasons, including to avoid spillage.

~~G. If a food facility is operated within a County facility that is located in a city that has adopted an ordinance prohibiting food facilities from providing single-use foodware accessories except upon request, the city's ordinance shall apply, and this Chapter shall not apply, to the extent that the city's ordinance conflicts with this Chapter.~~

SECTION 5. Section 12.86.023 is hereby deleted in its entirety:

~~**12.86.023 Exemption.**~~

~~"Health facilities," as defined in section 1250 of the California Health and Safety Code, are exempt from the requirements of this Chapter with respect to food and beverages that the health facilities serve to their patients and residents. However, food facilities that are located within health facilities and that provide ready-to-eat food to employees or the general public, such as cafeterias and snack bars, are not exempt from the requirements of this Chapter.~~

SECTION 6. Section 12.86.025 is hereby amended to read as follows:

12.86.025 Availability of Single-Use Accessories Through Third-Party, Online Food-Ordering Platforms.

A. Except as provided in subsection B, <u>below,</u> any third-party, online food-ordering business that conducts business in the unincorporated area of the County, either by picking up ready-to-eat food from a food facility located within the

unincorporated area of the County for delivery to a customer, or by delivering ready-to-eat food to a customer at a location within the unincorporated area of the County, shall comply with the following requirements to enable customers to select which single-use foodware accessories, if any, the customers ~~may~~ chooses to have included with their order:

1. Third-party, online food-ordering businesses must provide food facilities with the opportunity to specify which single-use foodware accessories, if any, the food facilities choose for customers to be offered on their menus appearing on the food-ordering platforms, so that customers may select which accessories, if any, they choose to have included with their orders.

2. If a food facility chooses not to specify any single-use foodware accessories to be offered to customers on its menu appearing on the food-ordering platform, then the third-party, online food-ordering business shall post the following statement with such food facility's menu: "This restaurant has chosen not to ~~include~~make single-use foodware accessories available on its online menu."

B. Third-party, online food-ordering businesses may, but are not required to, provide grocery stores with the opportunity to customize the menus appearing on the businesses' online food-ordering platforms in accordance with subsection A.1, above. However, neither a grocery store nor a third-party, online food-ordering business is permitted to provide a single-use foodware accessory to a customer unless the customer has requested it. If an online food-ordering platform does not include options for customers purchasing online from a grocery store to

request single-use foodware accessories, then no single-use foodware accessories may be provided to such online customers.

SECTION 7. Section 12.86.030 is hereby amended to read as follows:

12.86.030 ~~Enforcement and Penalty~~Full-Service Restaurants Required to Use Multiservice Utensils.

~~A. Enforcement Authority. The Director of Public Works and the Director of Public Health will enforce this Chapter. Both the Director of Public Works and the Director of Public Health, or their designees, are authorized to take any appropriate actions in the enforcement of this Chapter, including investigating and monitoring food facilities and third-party, online food-ordering businesses for compliance with this Chapter and taking administrative action in accordance with subsection C of this Section.~~

~~B. Rules and Guidelines. The Director of Public Works, in conjunction with the Director of Public Health, may promulgate rules and establish guidelines for implementing and enforcing this Chapter. Any such rules or guidelines shall become effective when the Director of Public Works submits them to the Executive Office of the Los Angeles County Board of Supervisors. The Director of Public Works and the Director of Public Health shall post any such rules and guidelines in an easily accessible location on their websites and shall also provide copies to any person upon request.~~

~~C. Administrative Action. Administrative fines may be imposed as follows, subject to the requirements of Sections 1.25.030 (Notice of violation), 1.25.040~~

~~(Administrative fines) and 1.25.050 (Imposition of administrative fines) of the Los Angeles County Code:~~

~~1. Before November 15, 2021, the Director of Public Works, in conjunction with the Director of Public Health, shall enforce only the requirements of Section 12.86.020.A that prohibit a food facility from providing a single-use plastic straw or single-use plastic stirrer to a customer without the customer's request and from providing a single-use plastic straw or single-use plastic stirrer to a customer in a self-serve dispenser or station. Before November 15, 2021, the first and second violations of the specific provisions of this Chapter that are referenced in this subsection, exclusively, shall result in a written warning notice regarding the violation, and any subsequent violation occurring before November 15, 2021, is considered an infraction punishable by a fine of twenty-five dollars ($25) for each day that the food facility is in violation, but not to exceed a total of three hundred dollars ($300).~~

~~2. Commencing on November 15, 2021, any violation of this Chapter is considered an infraction. The Director of Public Works and the Director of Public Health each is authorized to designate enforcement officers who, upon determining that a violation of this Chapter has occurred, may issue a notice of violation in accordance with Section 1.25.030 of this Code and a notice of administrative fine in accordance with Section 1.25.050 of this Code. Violations are punishable by fines as follows:~~

~~a. A violation by a food facility shall be punishable by a fine of up to one-hundred dollars ($100) for each day of violation, up to a maximum fine of one-thousand dollars ($1,000) per year.~~

~~b. A violation by third-party, online food-ordering business shall be punishable by a fine of up to one-hundred dollars ($100) for the first day of violation and up to two-hundred dollars ($200) for each additional day of violation.~~

~~D. Administrative Appeals. Any person served with a notice of administrative fine in accordance with subsection C of this Chapter and Section 1.25.050.A of this Code may, within thirty (30) days of receiving such notice, appeal the notice of administrative fine and/or the notice of violation upon which the notice of administrative fine is based, by submitting an appeal. In the absence of a submitted appeal, the notice of administrative fine shall be final. Any submitted appeal must include a statement as to why the fine should not be imposed or why the amount of the fine should be reduced, along with evidence in support of such statement. The Director of Public Works or the Director of Public Health, as the case may be, will, in their discretion, either affirm, revise, or revoke the administrative fine, and that decision will be final.~~

Full-service restaurants shall not provide single-use articles to customers with ready-to-eat food that they serve to customers for consumption on the premises. Full-service restaurants shall instead serve ready-to-eat food in, and/or with, multiservice utensils, except that full-service restaurants may provide single-use foil wrappers, napkins, straws, and placemats to customers who are dining on the premises so long as these single-use articles otherwise comply with the requirements of this Chapter. Nothing in this Section 12.86.030 is intended to prevent a full-service restaurant from providing single-use articles to customers with take-out food, or as a

container for customers to transport uneaten food, as long as such single-use articles otherwise comply with the requirements of this Chapter.

SECTION 8. Section 12.86.040 is hereby added to read as follows:

12.86.040 Prohibiting Retail Establishments from Selling Expanded Polystyrene Products.

A. Except as provided in subsection B, below, effective May 1, 2023, retail establishments shall not sell, rent, or offer any expanded polystyrene products to customers. This Section does not apply to online sales of products that are shipped from a location outside of the unincorporated area of the County.

B. The Director of Public Works is authorized to grant a general exemption from the requirements of Section 12.86.040 if, in the determination of the Director of Public Works, no substitute product that complies with subsection A, above, is readily available that can feasibly be used for a specific application. General exemptions granted under this subsection B shall be temporary and shall be canceled once the Director of Public Works determines that a substitute product that is not made of expanded polystyrene has become readily available. Exemptions granted under this subsection shall be set forth in the rules and guidelines adopted in accordance with Section 12.86.070.B of this Chapter. If the Director of Public Works cancels any exemption from the prohibition on the sale of expanded polystyrene projects, the Director of Public Works shall update its rules and guidelines accordingly. Any such revision to the rules and guidelines to cancel a previously granted exemption shall become effective one year following the date that the Director of Public Works submits

them to the Los Angeles County Board of Supervisors in accordance with Section 12.86.070.B.

SECTION 9. Section 12.86.050 is hereby added to read as follows:

12.86.050 Exemptions.

The requirements of this Chapter are subject to the following exemptions and qualifications:

A. The requirements of this Chapter do not apply to supplies and services provided in response to an emergency that is declared or ratified by the Los Angeles County Board of Supervisors, or the State or federal government.

B. The requirements of this Chapter do not apply to single-use articles that health facilities provide to patients with ready-to-eat food during the course of treatment. Health facilities are not exempt from the requirements of this Chapter with respect to single-use articles provided with ready-to-eat food served at food facilities located within such health facilities that sell or provide food to employees and/or the general public, such as cafeterias and snack bars. Nor are retail establishments that are located within health facilities exempt from any of the requirements of this Chapter.

C. If a food facility is operated within a County facility that is located in a city that has adopted an ordinance restricting the single-use articles that food facilities can provide to customers or prohibiting food facilities from providing single-use foodware accessories except upon request, the city's ordinance shall apply, and this Chapter shall not apply, to the extent that the city's ordinance conflicts with, or is stricter than, this Chapter.

SECTION 10. Section 12.86.060 is hereby added to read as follows:

12.86.060 Waivers; Process to Obtain.

A. The Director of Public Works, in collaboration with the Director of Public Health, may grant waivers, with or without conditions, based upon a determination that requiring a food facility or retail establishment to comply with this Chapter, or any portion thereof, would result in undue hardship. Undue hardship may include, but is not necessarily limited to, the following situations:

1. Compliance with the requirement in Section 12.86.030 that full service restaurants utilize reusable food service ware will result in undue hardship because of a restaurant's lack of adequate dishwashing facilities;

2. Compliance with this Chapter will result in an undue financial hardship for a food facility or retail establishment; and

3. A food facility or retail establishment purchased products that do not comply with the requirements of this Chapter before receiving notice of the requirements of this Chapter. A waiver under these circumstances shall be granted for only as long as is necessary for the food facility or retail establishment to use or sell such previously-purchased products.

B. Waivers may be granted for a specified period of up to one (1) year. During the waiver term, the food facility or retail establishment shall make diligent efforts to become compliant. Should a food facility or retail establishment demonstrate that, at the close or expiration of a granted waiver term, and with diligent efforts to become compliant, compliance remains infeasible or would result in undue hardship, the Director

of Public Works is authorized to extend the waiver for an additional specified period of time, except that waivers granted under subsection A.3, above, may not be renewed. It is the responsibility of the food facility or retail establishment to apply for any waivers or extensions in a timely manner.

C. The Director of Public Works, in collaboration with the Director of Public Health, shall adopt procedures for food facilities and retail establishments to apply for waivers from any requirement of this Chapter in accordance with Section 12.86.070.B.

SECTION 11. Section 12.86.070 is hereby added to read as follows:

12.86.070 Enforcement.

A. Except where this Chapter assigns an enforcement responsibility to a specific County officer, this Chapter shall be enforced by the Director of Public Works and the Director of Public Health, who shall allocate enforcement responsibilities between themselves. The Director of Public Works and the Director of Public Health are each authorized to take any appropriate actions to enforce this Chapter, including, but not limited to, inspection and monitoring of food facilities and retail establishments to determine compliance with this Chapter.

B. The Director of Public Works, in collaboration with the Director of Public Health, shall promulgate rules and establish guidelines for implementing and enforcing the ordinance consistent with this Chapter. Except as provided in Sections 12.86.015.E and 12.86.040.B, any such rules or guidelines, or amendments thereto, shall become effective when the Director of Public Works submits them to the

Los Angeles County Board of Supervisors. The Director of Public Works and the Director of Public Health shall each post these rules and guidelines in an easily accessible location on their websites, and shall provide copies to any person upon request.

SECTION 12. Section 12.86.080 is hereby added to read as follows:

12.86.080 Records.

Each food facility, third-party online food ordering platform, and retail establishment subject to this Chapter shall maintain records, in either written or electronic form, evidencing compliance with this Chapter, for a period of three (3) years, and shall make them available for inspection at the request of the Director of Public Works and/or the Director of Public Health.

SECTION 13. Section 12.86.090 is hereby added to read as follows:

12.86.090 Violations.

A. It shall be a violation of this Chapter for a food facility, third-party online food-ordering business, or retail establishment, or its agent(s) or employee(s), to violate any provision of this Chapter.

B. Causing, permitting, aiding, abetting, or concealing a violation of any provision of this Chapter shall constitute a violation.

C. The failure of a food facility, third-party online food-ordering business, or retail establishment, or its agent(s) or employee(s), to allow any authorized County official or such official's authorized representative to conduct unscheduled inspections of

the premises of the business for purposes of ensuring compliance with any provision of this Chapter, at any time the business is open for business, shall constitute a violation.

D. Any Person who deliberately falsifies records under Section 12.86.080.A is guilty of a misdemeanor.

E. A violation of this Chapter is hereby declared to be a public nuisance pursuant to this Code.

SECTION 14. Section 12.86.100 is hereby added to read as follows:

12.86.100 Remedies for Violations.

The following remedies, in addition to any other remedies allowed by law, are available for violations of this Chapter:

A. Administrative Action and Fines. Subject to the requirements of Chapter 1.25 of this Code, administrative actions, including administrative fines and noncompliance fees, may be taken and imposed.

1. A violation by a food facility or retail establishment shall be punishable by a fine of up to one hundred dollars ($100) for each day of violation, up to a maximum fine of one thousand dollars ($1,000) per year; and

2. A violation by a third-party, online food-ordering business shall be punishable by a fine of up to one hundred dollars ($100) for the first day of violation and up to two hundred dollars ($200) for each additional day of violation.

B. Civil Action and Civil Penalties. Any person that violates any provision of this Chapter may be subject to a civil action, including, but not limited to, an injunction,

and shall be liable for a civil penalty of up to one thousand dollars ($1,000) for each day of violation.

C. Criminal Prosecution. Any violation of the provisions of this Chapter may be charged as a misdemeanor or infraction pursuant to Chapter 1.24 of this Code.

SECTION 14. Section 12.86.150 is hereby added to read as follows:

12.86.150 Remedies for Violations.

Nothing in this Chapter shall be interpreted or applied so as to create any power or duty in conflict with any federal or State law. If any provision of this Chapter, or the application thereof to any person or circumstance, is held invalid, the remainder of this Chapter, or the application of such provision to other persons or circumstances, shall not be affected thereby.

SECTION 15. Effective Date.

Except as otherwise expressly provided, this ordinance shall be effective on June 1, 2022, or thirty (30) days after adoption by the Los Angeles County Board of Supervisors, whichever is later.

[CH1286JWCC]

ATTACHMENT II

PLASTIC WASTE IN LOS ANGELES COUNTY

IMPACTS, RECYCLABILITY, AND THE POTENTIAL FOR ALTERNATIVES IN THE FOOD SERVICE SECTOR

UCLA Luskin
Center for Innovation

ACKNOWLEDGMENTS

This report was prepared for the Los Angeles County Chief Sustainability Office by the UCLA Luskin Center for Innovation.

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DISCLAIMER

In the interest of soliciting candid, fact-based information, all individuals and entities interviewed for this report have been guaranteed confidentiality.

The analysis presented is that of the authors and not necessarily that of the funders or other aforementioned agencies and individuals. The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as actual or implied endorsement of such products.

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definition of terms

Biodegradable: Disposable items that are certified to break down in an appropriate environment within a certain time frame based on physical disintegration to pieces below a certain size and chemical decomposition, but which may leave behind certain nonorganic residues.

Bioplastic: Plastic polymers derived from naturally occurring organic compounds such as plant sugar, as opposed to petroleum.

Compostable: Disposable items that are certified to break down in an appropriate environment within a certain time frame based on physical disintegration to pieces below a certain size and chemical decomposition, resulting in solely organic matter. A more stringent classification than biodegradable.

De Facto Recyclability: The degree to which a given product is economically viable for recovery and processing to be used in the manufacture of a new item based on a holistic consideration of its features, including material properties, contamination, and sorting processes.

Food Service Ware: Items used to package and serve food and beverages by food service vendors (e.g., restaurants, food trucks, fast-food and fast-casual establishments). Includes plates, trays, bowls, clamshell containers, cups, lids, and accessory items like utensils, straws, and condiment packages.

Microplastics: Traditional petroleum-based plastic fragments measuring less than 5 millimeters in length that have been broken down over time by natural processes including ocean currents, photodegradation, oxidation, and hydrolysis.

Phthalates: Chemical additives used to make plastic resins more flexible and durable — also termed plasticizers.

Plastic: A broad class of versatile and durable carbon-based polymers derived from petroleum.

Recycled: When a product that has entered the waste stream is recovered by a material recovery facility, processed into its material components, and used in the manufacture of a new product.

Reusable: Items that are manufactured and sold with the intent of fulfilling their intended purposes multiple times before disposal.

Single-use: Items that are manufactured and sold with the intent of being used once before being discarded and entering the waste stream.

Technical Recyclability: The degree to which a given product is capable of being recovered and processed to be used in the manufacture of a new item based on its material properties, but not considering factors such as economic viability or contamination.

100% Fiber-based: Disposable items made from naturally occurring plant fibers such as bagasse (sugarcane or sorghum pulp) and bamboo.

Photo credit: iStock / Rawpixel

executive summary

In August 2019, the Los Angeles County Board of Supervisors unanimously adopted the OurCounty Sustainability Plan, a broad, regional strategy for transitioning the County to a more sustainable future. Action 107 of the Plan calls for the County, in cooperation with the City of Los Angeles, to phase out single-use plastics. In October 2019, the Board passed a motion directing the Los Angeles County Chief Sustainability Office to contract with the University of California Los Angeles (UCLA) Luskin Center for Innovation to study the issues of plastic waste, processing, recyclability, and alternatives in the County, and to use the resulting study to inform the drafting of an ordinance addressing plastic waste.

This report analyzes the impacts of plastic production and waste across several categories and explores the state of the Los Angeles County waste landscape. We discuss the technical aspects of plastics and their *de facto* recyclability, dependent on their resin type and several other factors. Finally, we analyze the potential benefits and drawbacks of adopting alternatives to single-use plastic food service ware, and discuss the lessons learned by jurisdictions that have adopted such policies. The conclusions of this report are based on an extensive review of academic research and numerous in-depth interviews with facility operators, waste industry experts, government officials, and product manufacturers, along with information provided by stakeholder groups.

Our key findings are:

- Available evidence suggests that there are adverse environmental, economic, energy-related, and human health-related impacts associated with plastic production and plastic waste in Los Angeles County. Single-use plastic food service ware is a contributing factor to all these impacts, and its outsized representation in litter suggests a particularly significant impact in the environmental sphere, the area for which impacts in Los Angeles County appear most acute.
- While all types of plastic resins are technically recyclable, a majority are not actually recycled. This difference in technical versus *de facto* recyclability is

driven by a variety of factors including material properties, product size, contamination from food residue and other substances, and market conditions.

- Only High-Density Polyethylene (HDPE, Code 2) products and Polyethylene Terephthalate (PET, Code 1) bottles are currently commonly recycled in Los Angeles County.
- Current recycling policies and practices do not effectively address the adverse impacts associated with single-use plastic food service ware. No recovery facility serving Los Angeles County currently recycles plastic food service ware, primarily due to issues of food residue contamination, product size, and product material.
- All available evidence suggests that replacing single-use plastic food service ware with reusable ware (e.g., multiuse dishware, cups, and utensils) will reduce the negative impacts of plastic waste in Los Angeles County. Expected effects include a reduction in the generation of nonrecyclable plastic solid waste, a decrease in the prevalence of plastic litter, and fiscal benefits to vendors, waste management operators, local governments, and ratepayers.
- In the food service sector, the adoption of compostable ware presents potential benefits, including lower net lifetime environmental impact and higher food waste diversion rates. Available evidence suggests that, of the potential alternatives, 100% fiber-based products without chemical treatments will produce the best outcome. Managing this transition will require ensuring the selection of products with a lower lifetime environmental impact than their nonplastic counterparts and expanding disposal options (e.g., composting infrastructure).
- The experiences of jurisdictions interviewed indicate that policies restricting plastics have been effective at reducing the adverse impacts of plastic waste with no reported negative economic impacts. These jurisdictions with instituted policies have provided avenues for vendors to claim exemptions for financial hardship, but the rate at which vendors have applied for such exemptions is very low, and only a handful have been granted to date.

Cleaning up: Litter cleanup and prevention efforts, property damages, and loss of tourism/industry revenue can be costly for municipalities and residents.
Photo credit: iStock / South_agency

I. introduction

In August 2019, the Los Angeles County Board of Supervisors unanimously adopted the OurCounty Sustainability Plan, a comprehensive strategic document outlining the County's approach to the future of sustainability in the region. Action 107 of the Plan calls for the County, in cooperation with the City of Los Angeles, to develop an equitable strategy to phase out single-use plastics.[1]

In October 2019, the Board adopted a motion directing the Chief Sustainability Office to contract with researchers at the University of California Los Angeles (UCLA) Luskin Center for Innovation to study the issue of plastic food service ware waste in the County. The study's purpose is to research the state of single-use plastics in the waste stream, especially food service ware, in order to aid the County in drafting an ordinance to reduce plastic waste.

This report contains the findings from that study. We first examine the broad impacts of plastic production and waste with respect to the environment, the economy, energy, and human health. This is followed by an overview of the Los Angeles County waste landscape: the various facilities and infrastructure that process waste in the region, the proportions of materials, and how recent developments in the market have caused significant disruption in how plastics are recycled. We then provide a background on the technical aspects of plastics — including properties and common uses of the various types — which are highly relevant to how they are recycled, if at all. From here we progress to an in-depth discussion on the *de facto* recyclability of plastics in Los Angeles County, discussing the fundamentals of the recycling process and how recyclability varies across different plastic types and products. We then discuss the state of alternatives to plastic within the food service sector, focusing on how reusable and compostable food service ware compares to plastic with regard to its environmental and economic impacts, along with other relevant factors. Last, we discuss the degree to which policies restricting plastic have proliferated in California in recent years and the key takeaways from implementing jurisdictions.

1 Los Angeles County Chief Sustainability Office. OurCounty. 2019. Retrieved from https://ourcountyla.org/strategies/strategy-9a?goal=836

II. analyzing the impacts of plastics

Plastics play a major role in everyday use. However, their negative impacts spanning *environmental, economic, energy, and health* sectors are reason for critical concern. The effects of these impacts are noted first and foremost in order to further contextualize the role of plastic in the waste stream and the need for respective regulation.

This section relies on an extensive literature review to first examine the harm marine environments face as a result of plastic litter — most commonly originating inland — polluting coastlines and oceans. Microplastics specifically, and the subsequent danger they present to all ecosystems, are further discussed.

Our analysis then transitions to how communities and economies are negatively affected, focusing on both direct and indirect losses cities suffer as a result of plastic debris. The millions of California taxpayer dollars allocated annually toward litter cleanup and prevention efforts are recognized as the primary fiscal cost of the state of plastic waste in the region. We also reference the energy-intensive nature of plastics and their reliance on nonrenewable energy sources for production. As production of disposable plastics grows, these impacts can be expected to increase significantly without immediate intervention.

Last, we examine the health impacts associated with plastics consumption. This sector necessitates further research in certain areas, especially concerning styrene's recent identification as a potential carcinogen.[2] Plastic chemicals that have been proven to threaten human health as endocrine disruptors (BPA and DEHP) are also examined.

Key Findings:

- Plastic is the primary source of land litter in California, making up seven of the top 10 litter products found on beaches, with four being food service ware.[3]
- Plastic litter infiltrates City drainage systems and accrues in landfills with a lifespan likely lasting centuries.[4]
- Urban runoff channels millions of tons of debris into oceans per year, threatening invaluable natural habitats and marine life.[5]
- Coastal cities incur significant economic costs as a result of litter cleanups and prevention efforts.
- Polluted shorelines lead to indirect costs to communities including losses in tourism revenue and damage to recreational/aesthetic values of the coastal environment.[6]
- Traditional petroleum-based plastics rely on nonrenewable energy sources for production and recovery, contributing to an increasing global carbon footprint throughout their lifecycle.[7]
- Recent studies have revealed that common chemicals found in plastics including styrene present a poten-

[2] p65list091319.pdf. (n.d.). https://oehha.ca.gov/media/downloads/proposition-65//p65list091319.pdf

[3] California Coastal Commission. California Coastal Cleanup Day History. Retrieved from https://www.coastal.ca.gov/publiced/ccd/history.html

[4] Jahn, A., Kier, B., & Stickel, B.H., (2013). *Waste In Our Water: The Annual Cost to California Communities of Reducing Litter That Pollutes Our Waterways*. Kier Associates. Retrieved from https://www.nrdc.org/sites/default/files/oce_13082701a.pdf

[5] National Oceanic and Atmospheric Administration (NOAA), "Marine Debris: Frequently Asked Questions." Retrieved from marinedebris.noaa.gov/info/faqs.html

[6] Midbust, J., Mori, M., Richter, P., & Vosti, B. (2014). Reducing Plastic Debris in the Los Angeles and San Gabriel River Watersheds (MESM Report). Bren School of Environmental Science & Management: University of California, Santa Barbara.

[7] Thompson, R.C., Moore, C J., Saal, F.S. vom, & Swan, S.H. (2009). Plastics, the environment and human health: current consensus and future trends. Philosophical Transactions of the Royal Society B: Biological Sciences. Retrieved from https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2009.0053

Cleaning up microplastics on the beach:

Over 8 million tons of plastic enter the oceans each year, degrading these and nearby natural habitats, and endangering fish, birds, turtles, and marine mammals who mistake microplastics for food.

Photo credit:
iStock / DisobeyArt

tial threat to human health, yet this field necessitates continued research and analysis.

- Bisphenol A (BPA) and di(2-ethylhexyl) phthalate (DEHP) plastic chemicals have also been regarded as hazardous to human health, particularly impacting the endocrine system.

Aquatic and Marine Impacts

Aquatic ecosystems, including rivers, lakes, ponds, streams, springs, and bays, provide our planet with critical benefits. The aquatic environment provides a habitat for an array of fish and other wildlife, acts as a water source for irrigation and drinking water, produces natural food sources, and helps to prevent and store flood water.[8] The vast marine environment, in addition to these benefits, also regulates our climate by transporting heat, produces over half of the world's oxygen, stores carbon dioxide, provides global economic goods and services, and also acts as a primary source of global transportation for trade and recreation.[9] Aquatic and marine environments additionally contribute invaluable natural beauty to our world.

Over 8 million tons of plastic enter the oceans each year, degrading these natural habitats and threatening wildlife species, tourism, and commercial fisheries.[10] The California Coastal Commission reports that plastics make up seven of the top 10 litter products found on beaches, with four being food service ware.[11] The Marine Debris Database produced by the nonprofit Heal the Bay corroborates these results, showing that from 1999 to 2019, plastic products were approximately 45% of the litter found on beaches.[12] Officials of both coastal cities interviewed for this report noted marine impacts as the *prime motivator* for their respective plastics ordinances.

Of crucial concern here is the sizable portion of single-use plastic waste that is littered. Inland litter is carried by rainwater and wind to gutters and storm drains, clogging systems that contribute to street

[8] Virginia Polytechnic Institute and State University. (2009). *Aquatic Habitats: Homes for Aquatic Animals* (Sustaining America's Aquatic Biodiversity). Virginia Cooperative Extension. Retrieved from https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/420/420-522/420-522_pdf.pdf

[9] National Oceanic and Atmospheric Administration (NOAA), "Why should we care about the ocean?" Retrieved from https://oceanservice.noaa.gov/facts/why-care-about-ocean.html

[10] United Nations Environment Programme. (n.d.). *Legal Limits on Single-Use Plastics and Microplastics: A Global Review of National Laws and Regulations*. UNEP.

[11] California Coastal Commission. California Coastal Cleanup Day History. Retrieved from https://www.coastal.ca.gov/publiced/ccd/history.html

[12] Heal the Bay. Marine Debris Database. Retrieved from http://mddb.healthebay.org/AnalysisWizard.aspx

flooding and traffic congestion, while leading debris into rivers, lakes, and the ocean. Researchers at the University of California Santa Barbara Bren School conclude that plastic debris collected in river and beach cleanups accounts for about half of all the trash amassed in California, with close to 50% being single-use plastic packaging items.[13] The researchers further report that urban runoff is the primary source of marine debris in the Los Angeles and San Gabriel River Watersheds, with litter recognized as the primary source of trash within urban runoff.[14] Plastic litter items subsequently impose high cleanup costs incurred by taxpayers, with Los Angeles County having spent $18 million in 2007 on litter prevention, cleanup, and education.[15]

Over time, natural ocean currents, photodegradation, oxidation, and hydrolysis break plastics down into fragments termed microplastics, which measure less than 5 millimeters in length.[16] A wide range of fish, birds, turtles, and marine mammals can ingest these particles, while larger items pose the risk of entanglement.[17] These impacts compromise natural processes and threaten wildlife with laceration or death.[18] The buoyancy of most plastic resins also causes debris to accrue on the sea surface. Moreover, marine organisms can inhabit floating plastic, allowing for both the transport of invasive species and buildup of sunken debris on the seafloor.[19]

Chemical leaching is also cause for concern. Additives including phthalates and BPA affect reproduction and impair development in a range of marine species.[20] Toxins from plastics can subsequently enter the food chain, posing a potential threat to human health.[21] Microplastics have been found in fish from California fish markets as well as in both drinking and bottled water.[22]

Economic and Community Impacts

Significant economic costs are incurred on coastal communities in both direct and indirect expenses related to plastic debris. With waste management responsibility falling on county and/or city public agencies, community residents are directly impacted regardless of their proximity to the ocean. Litter cleanup and prevention efforts, property damages, and tourism/industry revenue loss prove costly for municipalities and residents.[23]

The California Recycling and Plastic Pollution Reduction Act of 2020 reported that state taxpayers pay close to $420 million each year in beach cleanup and prevention efforts across all waste categories, with plastic items routinely identified as the most common litter type in coastal litter inventories.[24] Presumably, this cost can be lessened by improved waste management practices and consumer awareness. The nonprofit Natural Resources Defense Council further reported that the largest California communities spend an average of up to $4.4 million in annual street sweeping and $2.3 million in manual land litter cleanup.[25]

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13 Midbust, J., Mori, M., Richter, P., & Vosti, B. (2014). *Reducing Plastic Debris in the Los Angeles and San Gabriel River Watersheds* (MESM Report). Bren School of Environmental Science & Management: University of California, Santa Barbara.

14 Ibid.

15 Los Angeles County Department of Public Works. An Overview of Carryout Bags in Los Angeles County. 2007. P. 11. https://ladpw.org/epd/pdf/PlasticBagReport.pdf

16 Midbust, J., Mori, M., Richter, P., & Vosti, B. (2014). *Reducing Plastic Debris in the Los Angeles and San Gabriel River Watersheds* (MESM Report). Bren School of Environmental Science & Management: University of California, Santa Barbara.

17 Ibid.

18 Thompson, R.C., Moore, C.J., Saal, F.S. vom, & Swan, S.H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences*. Retrieved from https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2009.0053

19 Ibid.

20 Ibid.

21 Devasahayam, S., Raman, R., Chennakesavulu, K., & Bhattacharya, S. (2019). Plastics-Villain or Hero? Polymers and Recycled Polymers in Mineral and Metallurgical Processing-A Review. *Materials (Basel, Switzerland)*, *12*(4), 655. doi:10.3390/ma12040655

22 California Recycling and Plastic Pollution Reduction Act of 2020 (n.d.). Retrieved from https://caaquaculture.org/wp-content/uploads/2019/11/Plastics-Initiative.pdf

23 Jahn, A., Kier, B., & Stickel, B.H., (2013). *Waste In Our Water: The Annual Cost to California Communities of Reducing Litter That Pollutes Our Waterways*. Kier Associates. Retrieved from https://www.nrdc.org/sites/default/files/oce_13082701a.pdf

24 Ibid.; California Recycling and Plastic Pollution Reduction Act of 2020 (n.d.). Retrieved from https://caaquaculture.org/wp-content/uploads/2019/11/Plastics-Initiative.pdf

25 Jahn, A., Kier, B., & Stickel, B.H., (2013). *Waste In Our Water: The Annual Cost to California Communities of Reducing Litter That Pollutes Our Waterways*. Kier Associates. Retrieved from https://www.nrdc.org/sites/default/files/oce_13082701a.pdf

Multiple studies have also been conducted to estimate the intangible costs associated with plastic waste specifically. For instance, a 2019 study quantified the degradation to marine ecosystems per ton of plastic.[26] Researchers estimated this loss at $33,000 per ton of waste, revealing the potential fiscal impact of debris on marine environments.[27] Further research has additionally focused on the loss of tourism revenue resulting from plastic debris. When washed ashore, plastic litter visually impairs shorelines and pollutes public space.[28] To avoid littered beaches, visitors and residents may instead choose to travel to cleaner beaches, even at additional expense. The National Oceanic and Atmospheric Administration revealed that reducing marine litter by approximately 25% would save Orange County residents, for example, close to $32 million in travel time savings.[29]

Energy Impacts

Plastic production relies on nonrenewable energy sources including feedstock derived from petroleum.[30] While the U.S. Energy Information Administration is "unable to determine the specific amounts or origin of the feedstocks that are actually used to manufacture plastics in the United States," these processes have been reported to use close to 4% of global oil yields, with a proportional amount of energy used in the process.[31] With over one-third of plastic production dedicated specifically to plastic packaging, the rise in single-use plastic applications is likely to lead to significant increases in oil consumption.[32] Bottled water consumption in the United States alone rose 284% between 1994 and 2017, with 67% of all sales being single-use water bottles.[33]

The California Recycling and Plastic Pollution Reduction Act of 2020 notes that global plastic production is estimated to at least triple by 2050, which would encompass 20% of all fossil fuel consumption.[34] Ultimately, the energy-intensive nature of plastic manufacturing, production, and recovery further contributes to greenhouse gas emissions and a global reliance on fossil fuels.

Health Impacts

Adverse human health effects related to plastics have been studied more recently, with specific focus on the chemical styrene. This chemical has been determined to be a carcinogen by California's Office of Environmental Health Hazard Assessment and is of particular concern when heated.[35] Many studies emphasize negative effects of occupational, high-level exposure to styrene.[36] However, in terms of average human exposure, more robust scientific study on the topic is essential in order to further understand impacts.

Styrene is the main compound of polystyrene — a plastic type commonly used to make disposable food service ware. Polystyrene's foamed version (expanded polystyrene) is commonly used to make single-use clamshells

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[26] Beaumont et al. (2019). *Global ecological, social and economic impacts of marine plastic*. Elsevier: Plymouth Marine Laboratory.

[27] Ibid.

[28] Jahn, A., Kier, B., & Stickel, B.H., (2013). *Waste In Our Water: The Annual Cost to California Communities of Reducing Litter That Pollutes Our Waterways*. Kier Associates. Retrieved from https://www.nrdc.org/sites/default/files/oce_13082701a.pdf

[29] Industrial Economics Incorporated. Assessing the Economic Benefits of Reductions in Marine Debris: A Pilot Study of Beach Recreation in Orange County, California. 2014. P. 3. Retrieved from https://marinedebris.noaa.gov/report/economic-study-shows-marine-debris-costs-california-residents-millions-dollars

[30] Thompson, R.C., Moore, C.J., Saal, F.S. vom, & Swan, S.H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences*. Retrieved from https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2009.0053

[31] How much oil is used to make plastic? (n.d.). Retrieved from https://www.eia.gov/tools/faqs/faq.php?id=34&t=6; Thompson, R.C., Moore, C.J., Saal, F.S. vom, & Swan, S.H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences*. Retrieved from https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2009.0053

[32] Ibid.

[33] Goldsberry, C. (2018, December 20). Pressure to reduce consumption of single-use plastic packaging will continue into 2019. Retrieved January 10, 2020, from https://www.plasticstoday.com/packaging/pressure-reduce-consumption-single-use-plastic-packaging-will-continue-2019/8501551360001

[34] California Recycling and Plastic Pollution Reduction Act of 2020 (n.d.). Retrieved from https://caaquaculture.org/wp-content/uploads/2019/11/Plastics-Initiative.pdf

[35] p65list091319.pdf. (n.d.). Retrieved from https://oehha.ca.gov/media/downloads/proposition-65//p65list091319.pdf

[36] NTP (National Toxicology Program). 2016. Report on Carcinogens, 14th Edition.; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. Retrieved from https://ntp.niehs.nih.gov/go/roc14; Huff, J., & Infante, P.F. (2011). Styrene exposure and risk of cancer. Mutagenesis, 26(5), 583–584. https://doi.org/10.1093/mutage/ger033

and containers. Occupational studies have found that workers exposed to styrene have increased risks of lymphoma, leukemia, lung tumors, and pancreatic, urinary bladder, prostate, and colorectal cancers.[37] Elevated risks of lymphohematopoietic cancer have also been found among workers with high levels of styrene exposure.[38] According to the U.S. Environmental Protection Agency, chronic long-term exposure to styrene can affect the central nervous system, resulting in headaches, fatigue, weakness and depression.[39]

Due to extensive research, several agencies have consequently listed styrene as a hazardous substance. The International Agency for Research on Cancer, an intergovernmental agency that is part of the World Health Organization, recently updated its classification for styrene, determining that it is *probably* carcinogenic to humans.[40] This is an increase in the severity classification for the compound from its previous status as *possibly* carcinogenic. The National Toxicology Program, an interagency program within the U.S. Department of Health and Human Services, has also defined styrene as "reasonably anticipated to be a human carcinogen" due to limited evidence from human studies and ample evidence from animal studies.[41] In 2016, California's Office of Environmental Health Hazard Assessment listed styrene as a human carcinogen on California's Proposition 65 list.[42]

Research has shown that styrene is of particular concern for consumers because, when exposed to high temperatures, it can migrate from food packaging into the food it contains.[43] The level of styrene migration that occurs from food packaging highly depends on the level of fat content of the food as well.[44] The higher the fat content and the higher the temperature, the higher the level of styrene that is released.[45]

Several studies have identified additional plastic chemicals that threaten human health, including BPA and DEHP. BPA is the main component found in more durable plastics termed polycarbonates, commonly used to make *reusable* water bottles, baby bottles, and food containers. BPA can also be used as an additive for common plastics in order to strengthen material.[46] DEHP is another additive in many polyvinyl chloride products, often used to make materials more flexible and plastic-like.[47] Both chemicals have been determined to be endocrine disruptors, interfering with natural hormone function in the body and producing severe adverse effects in humans.[48] Despite the increase in BPA and DEHP-free products, BPA and DEHP still exist in some consumer products. However, they are largely absent from single-use food service ware.

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37 NTP (National Toxicology Program). 2016. Report on Carcinogens, 14th Edition.; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. Retrieved from https://ntp.niehs.nih.gov/go/roc14

38 Ibid.

39 US. EPA. styrene.pdf. (n.d.). Retrieved from https://www.epa.gov/sites/production/files/2016-09/documents/styrene.pdf

40 Aarhus University. (2018, May 30). After 40 years in limbo: Styrene is probably carcinogenic. *ScienceDaily*. Retrieved December 12, 2019, from www.sciencedaily.com/releases/2018/05/180530113105.htm

41 NTP (National Toxicology Program). 2016. Report on Carcinogens, 14th Edition.; Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. https://ntp.niehs.nih.gov/go/roc14

42 p65list091319.pdf. (n.d.). Retrieved from https://oehha.ca.gov/media/downloads/proposition-65//p65list091319.pdf

43 Tawfik, M.S., & Huyghebaert, A. (1998). Polystyrene cups and containers: styrene migration. Food Additives and Contaminants, 15(5), 592–599. https://doi.org/10.1080/02652039809374686

44 Ibid.

45 Ibid.

46 Manikkam, M., Tracey, R., Guerrero-Bosagna, C., & Skinner, M.K. (2013). Plastics Derived Endocrine Disruptors (BPA, DEHP and DBP) Induce Epigenetic Transgenerational Inheritance of Obesity, Reproductive Disease and Sperm Epimutations. PLOS ONE, 8(1), e55387. https://doi.org/10.1371/journal.pone.0055387

47 Ibid.

48 Halden, R. U. (2010). Plastics and health risks. Annual Review of Public Health, 31, 179–194. Retrieved December 16, 2019, from https://doi.org/10.1146/annurev.publhealth.012809.103714; Endocrine Disruptors. (n.d.). Retrieved December 16, 2019, from https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm

III. the problem of waste in Los Angeles County

To assess plastic waste in Los Angeles County, it is crucial to examine the waste management structure and waste stream. Different types of facilities process different types of materials. Historically, the County has relied on both private and public firms that operate materials recovery facilities, or MRFs, for waste processing. Composting facilities have traditionally played a lesser role in waste management, but recent industry changes will require increased reliance on these facilities.

This section is based primarily on interviews with waste management experts and is supplemented by information from County reports. It discusses waste management in Los Angeles County, the materials in the waste and recycling stream, and the impact of China's latest waste policy.

Key Findings:

- MRFs that sort and bale residential and commercial waste are the predominant waste processing operators in Los Angeles County.
- Many complex moving operations within the waste stream lead to a significant portion of waste being sent to landfill sites as convenient and economic solutions, yet plastic waste persists in landfill environments for up to centuries.
- Organic waste including many disposable plastic alternatives requires processing at composting facilities but insufficient composting infrastructure currently exists in the County.
- Plastics prove the most challenging material within the waste stream in terms of recovery limitations and disposal as litter.
- Recent Chinese policy imposing import restrictions have upturned the global recycling industry. The County has been severely impacted with where it can export regional waste but MRFs noted that the policy merely heightened existing problems.

Who Manages Waste in Los Angeles County and How?

The primary waste facilities in Los Angeles County for managing the recycling stream and some mixed-waste processing are materials recovery facilities (MRFs). These facilities receive waste from residential, commercial (including multifamily residences), or industrial sources. Waste is sorted and baled by material type, and ultimately sent to one of the following:[49]

- **A remanufacturing facility** accepts baled recyclable materials to turn into products or packaging.
- **A secondary MRF** can serve as a second line of defense after waste is sorted by the primary facility. Materials that would otherwise be destined for landfill can instead be recaptured. There is only one secondary MRF, Titus MRF Services, currently operating in Los Angeles County.
- **Waste-to-energy processing** combusts waste in order to produce and recover energy. These processes further divert waste from landfills.
- **Landfills** are sites where the majority of leftover materials are sent. Landfilled waste is layered up to hundreds of feet beneath the ground and is the oldest

[49] Los Angeles County Department of Public Works (2018). Polystyrene Food Service Ware in Los Angeles County. (2018). Retrieved from http://file.lacounty.gov/SDSInter/bos/supdocs/115952.pdf

form of waste treatment.[50] There are approximately 18 landfill sites operating in Los Angeles County.[51] Strong resistance to degradation allow all common plastic types to persist in landfills for centuries.

Sorting operations vary considerably depending on the MRF and the inputs received. Facilities either operate with mixed or presorted inputs. Mixed MRFs receive an aggregated waste stream of materials and must sort them accordingly. However, the majority of waste facilities in L.A. County receive presorted waste, also known as source-separated, which is the result of well-established two- or three-bin recycle collection systems. Even when receiving presorted recyclables from jurisdictions with bin systems, facilities must further sort by material type (e.g., plastic, cardboard). From the front end, it is important that materials are going into the right bins or trucks to ease the challenge of sorting at subsequent MRFs. There are approximately 55 large facilities in the County that process over 100 tons of waste per day.[52] This includes both MRFs and transfer stations, which consolidate waste picked up from garbage trucks.

Generally, MRFs receive paper, metals, glass, and plastics and some receive organic waste (e.g., food waste, yard waste, and plant-based food service ware). However, organic waste is not ideal to be mixed with those other materials for MRFs to process because it can contaminate the other materials and can be difficult to separate from other waste types.

It is more ideal for organic waste to be collected in a separate stream and sent to a composting or digestion facility; these facilities also play an important role in the County's waste structure. Based on our discussions with industry experts, a very limited number of composting facilities currently operate in the Los Angeles region. This is significant because there are not enough adequate facilities in place should the County transition away from single-use plastics to non-plastic materials/products. A more thorough explanation of compostable alternatives is further discussed in Section VII.

Materials in the Los Angeles County Waste Stream

It is important to understand the types and quantities of waste products in order to better assess the County's waste management practices. Waste distribution data is limited as 1) individual MRFs do not make their waste data publicly available for proprietary reasons, and 2) there is no accessible data on street-sweeping litter recovery in Los Angeles County. However, the Department of Resources Recycling and Recovery (CalRecycle) — the state agency overseeing waste management — does a county-level waste characterization in the form of residential and commercial streams by material type, the most recent being from 2014.[53]

In Los Angeles County, organics (45%), paper (19%), inert materials such as concrete (12%), plastics (10%), and metals (3%) make up the top five waste materials by tonnage produced by residences.[54] This includes both single-use and multifamily units. From the commercial waste stream, the top five materials are organics (36.8%), paper (30.3%), metal (9.4%), plastic (9.2%), and inert materials (9.1%).[55] While these figures may look different if considered by item count or volume, waste classification is primarily done by mass, and no other type of data is currently available. While MRFs receive all of these materials, plastics are among the most difficult to process and sell to market. According to various MRFs interviewed, this is because contamination is common in plastic materials and there are technological challenges to correctly sort different types of plastics. In addition, plastic materials are lightweight and can escape during transportation.

[50] County of Los Angeles Department of Public Health (n.d.). Solid Waste Management Program Facilities. Retrieved from http://publichealth.lacounty.gov/eh/EP/solid_waste/facilitieslandfill.htm?func=1&Landfill=landfill

[51] County of Los Angeles Department of Public Health (n.d.). Landfills. Retrieved from http://publichealth.lacounty.gov/eh/AreasofInterest/landfill.htm

[52] Los Angeles County Department of Public Works (2017). Countywide Integrated Waste Management Plan 2017 Annual Report. Retrieved from https://pw.lacounty.gov/epd/swims/ShowDoc.aspx?id=11230&hp=yes&type=PDF

[53] CalRecycle (2014). Solid Waste Characterizations Home. Retrieved from https://www2.calrecycle.ca.gov/WasteCharacterization/

[54] CalRecycle (2014). Residential Waste Stream by Material Type. Retrieved from https://www2.calrecycle.ca.gov/WasteCharacterization/ResidentialStreams?lg=1019&cy=19

[55] CalRecycle (2014). Business Group Waste Stream by Material Type. Retrieved from https://www2.calrecycle.ca.gov/WasteCharacterization/MaterialTypeStreams?lg=1019&cy=19

While plastics make up a smaller portion of the waste stream in terms of mass, they are disproportionately represented in the litter stream by item count and can ultimately make their way to the streets, beaches, and oceans as discussed in the previous section on impacts. Therefore, source reduction would lessen the detrimental effects plastics pose to the County both as waste and as litter. Furthermore, recent policies and regulation have made it even more difficult to manage the immense amount of waste, especially plastics in the waste stream.

How Recent Policy Has Upturned the Waste Industry

Traditionally, other countries have borne the brunt of solid waste from the United States. Prior to 2018, China was the preeminent market for waste exports, which relieved some of the waste burden for domestic municipalities but fostered a reliance on these external markets.[56] However, the implementation of China's "National Sword" policy in early 2018 significantly disrupted the market for plastic waste around the world. The policy imposed demanding restrictions on imported recyclable material and took effect immediately, giving the industry little time to sufficiently prepare. The new restrictions require the contamination level of recycled materials to be less than 0.5%.[57] This disruption has rippled throughout the global recycling markets and led to a sizable increase in waste material being kept in the United States after recovery by MRFs.

In the case of China's new restrictions, managing paper and plastic waste has become the most problematic. For example, one large facility in Los Angeles County noted that prior to the new restrictions, 98% of its paper went to China, but currently it exports only about 1%. This has had a significant economic impact, as the materials still need to be processed even if they are not sold. In some facilities, there is no longer a market for certain plastic materials, which results in their disposal at a landfill. All of the MRFs that were interviewed attested to the drastic change in market conditions that resulted from China's new policy. Not only does China no longer accept many materials, but other countries and facilities that purchase recovered materials have also implemented stricter contamination thresholds. China essentially strengthened quality control for all facilities. However, the MRFs also noted that contamination, infrastructure, and waste overabundance were already issues in the U.S. — the situation in China just highlighted and exacerbated them.

[56] Milman, Oliver. "'Moment of reckoning': US cities burn recyclables after China bans imports." *The Guardian*. February 21, 2019. Retrieved December 10, 2019, from https://www.theguardian.com/cities/2019/feb/21/philadelphia-covanta-incinerator-recyclables-china-ban-imports

[57] Resource Recycling, Inc. "China envisions years of 'National Swords.'" 2017. Retrieved from https://resource-recycling.com/plastics/2017/12/06/china-envisions-years-national-swords/

IV. the technical aspects of plastics

In order to understand the target of potential single-use plastics regulation in the County, it is crucial to take a detailed look into the different classifications and specific resin types that make up the more general plastics category. Traditional plastics are both inexpensive to make and durable to use, with a diversity of polymers that provide for a range of potential uses. These plastics' versatility and resistance to degradation can make them advantageous in food service ware applications.[58] These same resilient properties, however, consequently allow for plastic to persist in the environment, making complete decomposition nearly impossible.

We examine the different plastic resin types in this section, with an introduction to the general classifications of plastics including raw materials and subsequent additives. We then present the most common plastics more specifically by resin identification code, with listed properties, appearance traits and uses for each. This section concludes with a mention of recyclability challenges for these plastic resins, further analyzed in Section V.

Key Findings:

- Plastics are either identified as thermoplastics (able to be reheated and reshaped multiple times) or thermosets (limited to one permanent solid state). The most common types of plastic resins produced are thermoplastics.
- Their durability and versatility make traditional petroleum-based plastics suitable for a range of end-market uses and thus beneficial as single-use food service ware materials.
- For consumer and industry purposes, plastics are identified by resin identification codes (RICs) most often imprinted on the bottom of the product. These codes do not indicate recyclability — they instead serve as efficient sorting tools.
- None of the regularly used plastics (Codes 1-6) are biodegradable.[59]

Different Types of Plastics and Subsequent Impacts

Plastics are grouped into two general classifications: thermoplastics and thermosets. The former encompasses the majority of plastic products because of its design versatility and recoverability. Thermoplastics become liquid as opposed to burning when heated and solidify when cooled. They can be reheated and reshaped multiple times without compromising chemical properties, making them ideal for general food packaging applications. In contrast, thermosets are unable to melt back to original form, even at extreme temperatures. They can be heated only once. Thermosets remain in a permanent solid state once set and are thus more commonly used for automobile and construction materials.[60]

Most plastics are made with feedstock derived from petroleum including ethylene and propylene, making them inexpensive to manufacture. Further processing

[58] Thompson, R.C., Moore, C.J., Saal, F.S. vom, & Swan, S.H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences*. Retrieved from https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2009.0053

[59] Geyer, R., Jambeck, J. R., & Law, K. L. (2017). Production, use, and fate of all plastics ever made. *Science Advances*, 3(7). Retrieved from https://doi.org/10.1126/sciadv.1700782

[60] Marsh, K., & Bugusu, B. (2007). Food Packaging — Roles, Materials, and Environmental Issues. *Journal of Food Science*, 72(3), R39–R55. Retrieved from https://doi.org/10.1111/j.1750-3841.2007.00301.x

to a polymer resin typically requires the use of additives including plasticizers, stabilizers, dyes and chemicals in order to strengthen the material and improve performance.[61]

Resin identification codes imprinted on plastic products indicate the type of material they are made from. It is important to note that the RIC does not signify that it is recyclable or that it is derived from recycled materials.[62] Instead, the RIC system simply provides waste collectors and facilities throughout the recovery and recycling chains with a standardized sorting tool. The RIC system was developed by the Society of the Plastics Industry in 1988 and has since been recognized globally with the help of the American Society for Testing and Materials.[63]

There are seven identification codes used for varying thermoplastic resins. Each is represented as a number between 1 and 7 enclosed by a triangular symbol (see Table 1). There are six codes of commonly used resins: Polyethylene Terephthalate (PET or PETE, Code 1), High-Density Polyethylene (HDPE, Code 2), Polyvinyl Chloride (PVC, Code 3), Low-Density Polyethylene (LDPE, Code 4), Polypropylene (PP, Code 5), and Polystyrene (PS, Code 6). Code 7 (OTHER) is used for products made from either mixed resins or a resin type other than the first six. These resins vary widely in their technical properties, products they are commonly used for (discussed below) and in their recycling outcomes in Los Angeles County (indicated below, the reasons for which are discussed in Section V).

Plastic Resins by Resin Identification Code

1. **Polyethylene Terephthalate (PET or PETE, Code 1)**
   PET is one of the most regularly used plastics. PET is extremely strong and resistant to bacteria, in addition to being lightweight and easy to transport.[64] These properties make it particularly suitable for a variety of food service ware applications. Beverage bottles and food jars are commonly manufactured from PET, along with certain types of single-use food service ware including clamshells, containers, and cups. All MRFs in Los Angeles County — apart from operators focused on niche sectors (e.g., construction and demolition) — currently recycle PET beverage bottles and food jars.
2. **High-Density Polyethylene (HDPE, Code 2)**
   HDPE is also one of the most commonly used plastic types. Both the high- and low-density versions of polyethylene are inexpensive to make and easy to form.[65] HDPE is strong and durable, providing good resistance to chemicals and moisture. It can be made in natural form (clear) or colored, and is often used to manufacture bottles for milk, juice, detergents and shampoos, along with less robust products such as plastic grocery and retail bags. The HDPE recycling market is currently the healthiest among the various plastic resins, and is ubiquitously recovered by MRFs in the County.
3. **Polyvinyl Chloride (PVC, Code 3)**
   PVC is a strong and rigid plastic that can be softened and made more flexible with plasticizers, including phthalates.[66] Nonplasticized (rigid) PVC is commonly used for heavy construction applications because of its stiff and noncorrosive properties.[67] Plasticized (flexible) PVC film is often used to create plastic medical, cosmetics and device packaging. Plastic cling wrap was previously a popular byproduct, but safety concerns over the use of phthalates in food packaging have resulted in a rise in PVC plastic wrap alternatives including LDPE.[68] Recycling of both

[61] Thompson, R.C., Moore, C.J., Saal, F.S. vom, & Swan, S.H. (2009). Plastics, the environment and human health: current consensus and future trends. *Philosophical Transactions of the Royal Society B: Biological Sciences*. Retrieved from https://royalsocietypublishing.org/doi/abs/10.1098/rstb.2009.0053

[62] Plastic Resins. (n.d.). Retrieved from https://www.calrecycle.ca.gov/plastics/resins

[63] Standard Practice for Coding Plastic Manufactured Articles for Resin Identification. (n.d.). ASTM International. Retrieved from https://www.astm.org/COMMIT/d7611.pdf

[64] Plastic Resins. (n.d.). Retrieved from https://www.calrecycle.ca.gov/plastics/resins

[65] Marsh, K., & Bugusu, B. (2007). Food Packaging — Roles, Materials, and Environmental Issues. Journal of Food Science, 72(3), R39–R55. Retrieved from https://doi.org/10.1111/j.1750-3841.2007.00301.x

[66] Plastic Resins. (n.d.). Retrieved from https://www.calrecycle.ca.gov/plastics/resins

[67] Ibid.

[68] Marsh, K., & Bugusu, B. (2007). Food Packaging — Roles, Materials, and Environmental Issues. *Journal of Food Science,* 72(3), R39–R55. Retrieved from https://doi.org/10.1111/j.1750-3841.2007.00301.x

forms is generally limited in Los Angeles County because they are difficult to identify and isolate in sorting processes, given the wide variety of products for which they are used.

4. **Low-Density Polyethylene (LDPE, Code 4)**
   LDPE is flexible and resistant to moisture, chemicals, and force.[69] Its lower density (compared to HDPE) and soft texture make it popular to use for nonfood service ware applications including plastic film and packaging (e.g., bags for trash, dry cleaning, newspapers, and produce). It is also used as an alternative to PVC plastic cling wraps. Rigid LDPE is used to make lids, caps, and toy products. There is currently no healthy market for recycled LDPE, and as such, it is not recycled in Los Angeles County.
5. **Polypropylene (PP, Code 5)**
   PP is extremely versatile and heat resistant. Its high melting point allows it to work well for use in food containers that are microwave and dishwasher safe, while also being a popular resin to make yogurt, ice cream, and pharmaceutical containers in addition to straws.[70] Its stiffness and moisture barriers allow it to be used for many appliances and automotive parts. PP can also be made into a fiber, often used for carpeting. Economically viable recycling of PP requires optical sorting equipment under current market conditions, and some facilities with this equipment currently recover PP in Los Angeles County. However, MRFs using only manual sorting methods have generally been unable to recover PP products.
6. **Polystyrene (PS, Code 6)**
   PS is naturally hard and brittle with a relatively low resistance to heat. It is inexpensive to produce and can be made into a solid or foam. Solid PS is often used to make disposable cutlery and smoke detector cases. Expanded polystyrene (EPS) white foam is conversely extremely lightweight and predominantly made of air. EPS is often, but erroneously, called "Styrofoam." However, Styrofoam is a particular brand of *extruded* polystyrene (XPS), a fundamentally different product.[71]
   EPS is used for food packaging (e.g., clamshells, cups, plates, and trays) as well as for protective packaging (e.g., egg cartons, coolers, cushioning, and building materials) because of its thermal insulation and impact protection. Its cheap nature lends itself to single-use disposal products, yet PS/EPS waste is especially difficult to transport and sort due to its weight. Its low density also makes it difficult for facilities to recover a mass of PS/EPS that is sufficient for recycling in an economically viable manner. PS recycling is thus generally inefficient and not practiced in Los Angeles County, and most PS/EPS goods — including food service ware — are either landfilled or littered.
7. **OTHER or Mixed Plastics (Code 7)**
   Plastics made of more than one resin or those that do not fit the previous categories are deemed OTHER. This category includes acrylic and nylon polymers. Code 7 products are not typically recyclable in Los Angeles County; however, bio-based and biodegradable alternatives to traditional plastics, such as polylactic acid, fall within this category and may have better recovery potential depending on available options for disposal (e.g., composting)

[69] Ibid.

[70] Ibid.

[71] Kingspan Insulation Middle East (2017). What is the difference between XPS and EPS? *Kingspan Group*. Retrieved January 6, 2020, from https://www.kingspan.com/meati/en-in/product-groups/insulation/knowledge-base/articles/general/what-is-the-difference-between-xps-and-eps.

Table 1: Plastic Resins by Resin Identification Code (RIC)

RIC	RESIN TYPE	PROPERTIES	USES	RECYCLED IN LA COUNTY
1 PET	Polyethylene Terephtalate	Lightweight; strong; resistant to bacteria; can be clear or color-matched	Water bottles; soda bottles; jars for spreads/jams; clamshells	Yes — bottles and jars only
2 HDPE	High-Density Polyethylene	Inexpensive; easy to form; strong; durable; resistant to chemicals and moisture; permeable to gas	Milk bottles; juice bottles; detergent/shampoo bottles; plastic grocery and retail bags	Yes
3 PVC	Polyvinyl Chloride	(Rigid) PVC: strong; stiff; noncorrosive (Flexible) PVC: softened with plasticizers	(Rigid) PVC: construction applications (Flexible) PVC: cling wrap; medical packaging; cosmetics packaging	No
4 LDPE	Low-Density Polyethylene	Flexible; soft; moisture-resistant; chemical-resistant	Plastic film; trash bags; dry cleaning bags; produce bags (Rigid) LDPE: lids; caps; toy products	No
5 PP	Polypropylene	Heat- and moisture-resistant; stiff	Yogurt containers; ice cream containers; microwavable food containers; automotive parts; carpeting	No — optical sorting-equipped facilities only
6 PS	Polystyrene	(PS): hard; brittle; low heat resistance; inexpensive (EPS): lightweight; thermal insulation; impact protection	(PS): disposable cutlery; smoke detector cases (EPS): clamshells; cups; plates; trays; egg cartons; coolers; cushioning	No
7 OTHER	Other	Mixed resins: acrylic, nylon; bioplastics (PLA)	Bottles; multilayer packaging	No

Major Considerations Regarding Plastics Recovery

Compared to glass or metals, plastics require more thorough sorting to be recycled, as each resin type varies by property and heat resistance. Plastics sorting is especially challenging because many plastic products are small and lightweight. Despite most plastics being technically recyclable, the fate of any given product depends heavily on market conditions and infrastructure.

v. recyclability of plastics

The recyclability of plastics is a central element in considering options to reduce generation and litter of plastic waste. Recycling reduces the overall environmental impact of plastic usage and reduces the burden of plastic waste on solid waste disposal systems. This waste must be hauled and processed by waste management operators and facilities, occupies limited landfill space, and can, in some cases, contaminate and degrade the value of other recyclable materials.

However, contrary to what may be a common perception, not all plastics are recycled. It is important to note that, while it is technically possible to recycle most plastics, there are many types for which it does not make economic sense to do so. The actual recyclability of any given plastic product depends on the type of plastic, market conditions, and other factors like contamination. Furthermore, there are fundamental aspects of the recycling process — such as the degradation in material quality that occurs — that limit the extent to which it can assist in addressing the problem of plastic waste.

In this section we first discuss the basic processes through which recycling works and why these processes cannot be used in isolation to address the issue of plastic waste. This is followed by an overview of how MRFs process and recover plastics for recycling. We then identify the key categories of plastics that are commonly recycled in Los Angeles County and those that are not, with additional discussion of certain types of products — including single-use plastic food service ware — that are especially problematic, along with a brief discussion of recycling market conditions.

Key Findings:

- Only HDPE (Code 2) products like milk jugs and detergent bottles and PET (Code 1) bottles (such as those used for beverages) and jars are currently commonly recycled in Los Angeles County.
- Polypropylene (Code 5) plastic is recovered effectively only in facilities with certain types of equipment, and plastics with codes 3, 4, 6, and 7 are generally landfilled.
- Single-use plastic food service ware, among other items, is especially challenging for MRFs to process and recover for recycling. Due to these challenges, single-use plastic food service ware is generally not recycled in the County.
- The limitations of recycling make it insufficient to be the sole means of addressing the impacts of plastic production and waste.

The Fundamentals of Plastic Recycling

Even under optimal circumstances, the current common process of recycling plastic resins is imperfect. Plastic items recovered at a MRF or equivalent facility are typically mechanically broken down via shredding or grinding, then subjected to high temperatures to melt the plastic into pellets.[72] These pellets can then be sold to product manufacturers.

However, this process degrades the quality of recycled plastic compared to virgin material. The polymers of plastic resins are affected negatively both during the normal lifetime of the original product and by the recycling process.[73] Additionally, the incidence of impure inputs and contamination that often occurs can produce mixed-resin products that are less valuable and versatile than pure or virgin material. In cases where products are manufactured from multiple material types that cannot

[72] Tullo, Alexander H (2019). Plastic has a problem; is chemical recycling the solution? Chemical & Engineering News 97 (39). Retrieved December 10, 2019, from https://cen.acs.org/environment/recycling/Plastic-problem-chemical-recycling-solution/97/i39

[73] La Mantia, Francesco Paolo (2004). Polymer Mechanical Recycling: Downcycling or Upcycling? Progress in Rubber, Plastics and Recycling Technology 20(1). https://doi.org/10.1177%2F147776060402000102.

be readily separated, this outcome is more-or-less inevitable. This phenomenon, whereby recycling produces a less desirable product than the inputted material, is termed "downcycling."[74]

Downcycling has significant ramifications for the role of recycling in reducing plastic waste and its associated impacts. First, it imposes a terminal point on the life of any given plastic product, past which further recycling of the resin will produce recovered material so degraded that it is essentially valueless. Consequently, the current model of recycling likely does not displace production of new plastic on a one-to-one basis, even though many assessments of recycling benefits have assumed this condition.[75] This concept is illustrated by the findings of a 2016 World Economic Forum report, noting that despite a global 14% collection rate of plastic packaging for recycling, only 5% of the material value was retained post-processing.[76] It is estimated that, between 1950 and 2015, only 0.9% of plastics produced has been recycled more than once, and doing so may not be an unequivocal benefit given the inputs of the process combined with the diminishing returns of the product.[77]

Second, recycled material merely delays production of virgin material from fossil fuel precursors until a later date.[78] This means that recycling alone, using current common methods, is incapable of eliminating the impacts — such as greenhouse gas emissions — of plastic production, even in the unlikely event that recycling rates reached 100%.

However, in comparison to other historically common disposal options such as landfilling and incineration, recycling has consistently been the least harmful option from an environmental standpoint.[79] Therefore, while not a comprehensive solution to the impacts of plastic waste and production, increased recycling of plastic in Los Angeles County will likely be beneficial in the short to mid term. Without incorporation of as-yet unproven technologies and strategies that allow for one-to-one displacement of virgin with recycled material, though, plastic recycling in the long term will depend on the continued production of new material from fossil fuel stocks.

Most notable among these approaches are chemical recycling processes and related technologies.[80] These offer a fundamentally different model of recycling plastic, with potentially transformative impacts on the plastic and recycling industries. Under this approach, the monomer building blocks of plastics are dissolved, allowing them to be either reassembled — with no decrease in product quality, theoretically — or converted to a combustible fuel. The former is referred to as monomer recycling, while the latter procedure includes processes such as gasification and pyrolysis.[81] However, these approaches are in their nascent stages and have not been implemented in a commercially viable, scaled facility in the United States. Development and expansion to the necessary extent would require massive monetary investment, to the tune of billions of dollars.[82] Furthermore, fuel-producing procedures like pyrolysis perpetuate the practice of combusting fossil fuels for energy, albeit with the insertion of an extra stage in the life of the product.

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74 Geyer, Roland, Brandon Kuczenski, Trevor Zink, Ashley Henderson (2015). Common Misconceptions about Recycling. Journal of Industrial Ecology 20(5), 1010-1017. https://doi.org/10.1111/jiec.12355.

75 Ibid.

76 World Economic Forum (2016). The New Plastics Economy: Rethinking the future of plastics. Retrieved December 10, 2019, from http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf

77 Geyer, Roland, Jenna R. Jambeck, Kara Lavender Law (2017). Production, use, and fate of all plastics ever made. ScienceAdvances 3(7). DOI: 10.1126/sciadv.1700782.

78 Geyer, Roland, Brandon Kuczenski, Trevor Zink, Ashley Henderson (2015). Common Misconceptions about Recycling. Journal of Industrial Ecology 20(5), 1010-1017. https://doi.org/10.1111/jiec.12355.

79 Bernardo, C.A., Carla L. Simoes, Ligia M. Costa Pinto (2016). Environmental and economic life cycle analysis of plastic waste management options. A review. *AIP Conference Proceedings* 1779(140001). https://doi.org/10.1063/1.4965581.

80 Chaudhur, Saabira (2019). Plastic Backlash Leads to Bets on Old Recycling Technology. *The Wall Street Journal*. Retrieved December 10, 2019, from https://www.wsj.com/articles/companies-dust-off-old-technology-in-search-of-high-quality-recycled-plastic-11575801000

81 Hundertmark, Thomas, Mirjam Mayer, Chris McNally, Theo Jan Simons, Christof Witte (2018). How plastics waste recycling could transform the chemical industry. *McKinsey & Company*. Retrieved December 10, 2019, from https://www.mckinsey.com/industries/chemicals/our-insights/how-plastics-waste-recycling-could-transform-the-chemical-industry

82 Ibid.

How Materials Recovery Facilities Recover Recyclable Plastic

MRFs recover recyclable material in a manner similar to an assembly line. The raw waste materials are spread out on a conveyor. As the material makes its way through the facility, each stage attempts to separate out particular types of valuable material. These materials include paper and cardboard, ferrous metals (e.g., tin cans), nonferrous metals (e.g., aluminum cans), plastic, and glass.

Isolation of recyclable plastic is done via several mechanisms:

A. ***Optical Sorters*** (see Figure 1). The most effective method currently in use, optical sorters identify types of plastic based on how light reflects off a given item. The device scans passing items for a match to the reflectivity profile with which they are programmed. Waste proceeds beneath the scanner on a conveyor belt and plastics that the scanner identifies as desirable are directed to a separate sorting line with blasts from air jets. Other items, including plastics that do not match the scanner's profile, pass through.

   Optical sorters have the advantage of achieving high recovery rates while maintaining high throughput volumes and minimizing contamination. However, there are drawbacks. The equipment is expensive, with an individual unit costing nearly $650,000 in equipment, transport, and installation, in addition to lost operations time. As a result, the equipment is not yet ubiquitous at MRFs processing waste from Los Angeles County. While six of seven MRF operators interviewed for this report indicated the presence of optical sorting equipment at some of their facilities, five indicated that they operate some facilities that do not have the technology.

Despite their advantages, optical sorters are imperfect. The reflective scanning mechanism cannot recognize black plastic items, nor can it identify plastic products that are contaminated with food or another residue. Lightweight plastic items may also be problematic, as they are not easily redirected by the air jet used to separate valuable material. Such problems illustrate the need for better alignment between product specifications and options for end-of-life disposal.

Figure 1: An optical sorter at work.

Items on the conveyor are carried under the optical scanners, which identify desirable materials to be redirected with targeted air jets to a different destination. Other items fall to the next stage of the material recovery facility system.

Figure 2: An example of a robotic sorting system used in material recovery facilities.

Essentially a cross between optical sorters and human personnel, they employ programmable scanners to identify items on a conveyor and mechanically separating them.

Source: Bulk Handling Systems. Max-AI https://www.max-ai.com/

B. ***Robotic sorters*** (see Figure 2). Robotic sorters operate essentially as a cross between optical sorters and human personnel, using programmable scanners to identify items on a conveyor and mechanically separating them with an arm or similar device. Robotic automation allows for significantly higher "picks per minute" (items separated from a conveyor in a minute) than a human worker, helping to improve recovery rate of recyclable materials.

   Robotic sorters are far less expensive than optical sorting equipment, with costs reported by one MRF operator ranging from $200,000 to $250,000. They can also be more easily integrated into existing facilities than optical sorters. Despite this, the technology is not ubiquitous. Four of seven MRF operators interviewed indicated that their facilities already utilized or were considering implementing robotic sorting.

   A major drawback is that robotic sorters do not achieve nearly the same level of performance as optical sorters: The latter can perform approximately 600 picks per minute compared to the 60 by the robots, a factor of 10 difference.[83] Based on conversations with industry experts, future market conditions will likely necessitate widespread adoption of optical sorters, though robotics could serve as an interim improvement and as a backup to optical technology.

C. ***Manual separation.*** Recyclable plastic items can be removed from conveyors by human personnel identifying them by sight. Most, if not all, MRFs continue to use human personnel for sorting in some capacity. Even in facilities equipped with optical and robotic sorters, human workers continue to serve as a backstop, catching materials that manage to pass through the automated systems. However, sorting by hand is slower, less efficient, and less reliable than automated methods. Repetitive motions can make workers prone to workplace injury and, as in many industries, automated methods are generally more consistent in terms of work schedules while being less expensive.

What Is Recyclable? Plastics and Product Categories

Based on conversations with operators and experts in the Los Angeles area waste industry, two of the major plastic resin types are currently viable for recycling. However, these plastics vary in their recyclability depending on the type of product they are used to make.

A. ***High-Density Polyethylene (HDPE, Code 2):*** HDPE is currently the most valuable plastic resin type for recovery in the Los Angeles area. All MRF operators interviewed (eight of eight) currently recover HDPE, separating it by "natural" — the semitransparent

[83] Redling, Adam (2018). Sorting it all out: Considerations for integrating optical sorters and robotics in a MRF. *Recycling Today*. Retrieved November 30, 2019, from https://www.recyclingtoday.com/article/considerations-for-integrating-optical-sorters-and-robotics-in-a-mrf

form — and "colored" — the opaque variant that comes in a multitude of colors. While these two forms of HDPE have separate pricing markets, both are quite robust, with recovered material fetching a significantly higher price than other plastic types.

B. ***Polyethylene terephthalate (PET or PETE, Code 1):*** PET is currently recovered by most MRFs serving Los Angeles County; seven of eight indicated they currently recovery the material, the exception being a MRF that primarily processes demolition and construction material, and as such does not receive significant amounts of PET plastic. However, two significant limitations make PET a less attractive option for recovery, generally, than HDPE. First, based on conversation with industry experts, the only category of PET plastic products that are consistently recycled are beverage bottles and jars. While such products are consumed and recovered in significant numbers, usage of other categories of PET products, including food service ware, is not beneficial if recyclability is a priority. Second, the market price for recovered PET is not as high as that for HDPE, resulting in slimmer profitability margins for operators.

Polypropylene (PP, Code 5) merits special discussion. Currently, PP is not commonly recovered by facilities in the Los Angeles area; only one MRF operator interviewed recovers the material, and at only one facility. PP can be recovered and sold at a profit at this facility because of a significant investment in optical sorting technology. As more facilities integrate optical sorters into their recovery processes PP may become more viable for widespread recovery, but it is not generally recycled under current conditions. Government support for such capital investment may be helpful in speeding the adoption of this technology, enhancing the degree to which PP is recovered.

Outside of these categories, other plastics — regardless of the type of product — are not recovered and are sent to landfills. This includes PVC (Code 3), LDPE (Code 4), PS and EPS (Code 6), and OTHER or mixed plastics (Code 7). There are rare exceptions in niche cases that are not representative of conditions in the broader waste landscape. One MRF interviewed continues to bale mixed plastics (Codes 3-7) at a facility outside the Los Angeles region, but these products are a small component of the waste stream and are almost valueless for post-recovery sale. This facility continues to recover these materials essentially because they have the capacity to do so and it represents an environmental benefit, despite being neutral in fiscal terms.

Certain types or categories of plastic products are especially difficult to recover and recycle. These products are unlikely to be recyclable in the foreseeable future and in some cases can be actively detrimental to the recycling of other materials. Included in this category are expanded polystyrene, plastic food service ware and accessories, small plastic pieces, and items that are harmful or dangerous to MRF personnel and equipment.

a. ***Expanded polystyrene (EPS):*** EPS is particularly difficult to recycle and can be actively detrimental to MRF operations. The lightweight, low-mass nature of EPS makes it challenging for facility equipment to consistently direct materials through the conveyors and machinery used in the recovery process. Additionally, fragmentation of EPS blocks and products can produce large numbers of plastic particles that pervade facilities and contaminate other recoverable materials.
   In the context of food service ware, EPS tends to absorb more grease and oil than other commonly used plastics, making it more difficult to recycle and degrading its already-low value.

b. ***Plastic food service ware and accessories:*** Disposable plastic food service ware — which may be manufactured from several different resins, including PET, PP, and PS or EPS — is challenging to recover due to the issues of food residue and small size. Only one of the eight MRF operators interviewed indicated that it currently recovers and bales plastic food service ware on a routine basis at any locations, and this facility is not part of the Los Angeles County waste landscape. A notable component of this operation is a concerted public education campaign to encourage residents to rinse food service ware before placing it in the recycle bin, a program with no current analog in the County. Additionally, such practices are infeasible in instances when customers do not have access to the facilities

necessary to do so (e.g., a public beach). No Los Angeles-based MRF indicated that it recovers and recycles plastic food service ware.

Even when relatively clean, the size and construction of plastic food service ware makes recovery difficult. Small accessory items, such as straws and utensils, are hard to process and bale. Larger items like food clamshell containers can still be difficult to recover using optical sorters, as the air jets used to separate items can cause lightweight items to miss their intended destination.

In addition to the issue of recovering plastic food service ware, food waste and residue can contaminate other products in the recycling stream, reducing their value or making them unrecoverable. This is especially problematic when food waste soils fiber-based material like paper or cardboard.

Based on conversations with industry experts, there is potential for plastic food service ware beverage containers, such as PET cups used for cold beverages, to be recovered. Contamination is a minimal issue with this category of items compared to other types of food service ware. While no Los Angeles area MRF interviewed indicated that they make a concerted effort to recover such items, it seems likely that optical sorting technology could easily identify and separate these products.

c. ***Small plastic pieces:*** Small pieces of plastic — less than a few inches long — are challenging to recover and bale in a manner that is efficient enough for it to be sustainable by a MRF. Such items can easily become scattered in unintended ways during the sorting process. Each piece also represents a small mass of material, and thus it is more difficult to achieve the volumes necessary to bale and sell the recovered plastic. These items may be more viable for recovery in a secondary MRF processing residual inputs from multiple MRFs. The only facility operating under this model is the Los Angeles location operated by Titus MRF Services.

   Common types of items that fall into this category include aforementioned food service ware accessories like straws and utensils, pieces of packaging from unpacked consumer goods, bottle caps, and small consumer items (e.g., plastic toys, cotton swabs).

d. ***Harmful or dangerous items:*** Several MRF o perators identified commonly encountered items that can be harmful to their processes by jamming or damaging equipment, and which can potentially cause workplace injuries to facility personnel. These include some items containing plastic such as package bindings or webbing, garden hoses, and pet food bags. Generally, tough plastic products that can become wound around machinery are hazardous to MRF operations.

Market Factors for Recovered Plastic

China's National Sword regulation has drastically lowered the acceptable contamination threshold for baled recovered material that most MRFs strive to achieve while simultaneously cratering the market for some plastic materials, most notably mixed plastics (bales of material with Codes 3-7) and product categories with high contamination rates like single-use food service ware. However, the change represents an environmental benefit: Several interviewed operators characterized National Sword not as creating a new problem for recycling, but merely making extant issues harder to ignore. The policy forced the domestic waste industry to confront the fact that significant quantities of "recyclable" material shipped across the Pacific Ocean were, in fact, being incinerated, littered, or landfilled.

The rippling effects of National Sword have imposed new fiscal burdens on operators, customers, and municipal governments in the Los Angeles region and across the United States. The primary driving force behind these disruptions is the decreases in value for several categories of items previously considered recyclable, such as mixed plastics (Codes 3-7), paper, and cardboard.[84] In some cases, values for certain goods have fallen so precipitously that operators are paying landfills or other destinations to have an output option for the material,

[84] Wisckol, Martin (2019). Your recyclables are going to the dump and here's why. Orange County Register. Retrieved January 7, 2020 from https://www.ocregister.com/2019/05/17/your-recyclables-are-going-to-the-dump-heres-why/

whereas previously these items would have been a source of profit.[85] This has led many operators in the waste industry — including haulers, MRFs, and recycling centers — to experience a sizable drop in revenue, putting them in dire financial straits.

Consequent outcomes have been varied. Many facilities, including several recycling centers and MRFs in Los Angeles County, have closed since 2018 because of operational losses.[86] Other locations in California remain open but face operational losses — which can exceed millions of dollars annually — that threaten their longevity.[87] In many other instances, operators have cut back on services or raised prices through newly negotiated municipal contracts or weekly rates, imposing additional costs onto local governments and customers.[88] The economic impact on these parties is compounded by falling revenue from recycling programs. An illustrative example is the City of San Diego, which expected to receive approximately $600,000 in revenue from its recycling contractors for the 2019 fiscal year compared to $4 million in 2017.[89] Thus, while firm figures have been difficult to identify for Los Angeles County or the City of Los Angeles, it is likely that they and ratepayers are bearing millions of dollars in additional costs due to changes in the recycling market since 2018.

For MRFs in the Los Angeles region, international markets currently play a significantly smaller role with regard to selling recovered plastic compared to pre-National Sword regulation. All six applicable MRFs interviewed indicated that their primary market for major resin categories — especially PET (Code 1) and HDPE (Code 2) — were now within California. The market for these resins, especially PET, is strong in the Los Angeles region specifically. Several MRFs also indicated that Alabama-based KW Plastics is a high-profile destination, particularly for resins other than PET and HDPE (i.e., Polypropylene, Code 5).

Four MRFs indicated that small markets for particular resins continue to exist overseas in Southeast Asia, including Indonesia and Vietnam. However, this is predominantly polypropylene (Code 5) and, at the one facility interviewed that still bales it, mixed plastics (Codes 3-7), as there are robust domestic markets for PET (Code 1) and HDPE (Code 2).

More generally, there is some caution amongst MRF operators about how market conditions may continue to fluctuate and the impacts this may have on their business. Currently, the only plastic resins that can be said with confidence to have healthy, stable markets are PET and HDPE. The market for PP, according to one operator, is teetering on the edge of viability. Besides niche cases, as aforementioned, other categories of plastic are not generally economically viable to recover in Los Angeles County.

An important element of the National Sword regulation is that it demonstrated to operators that market conditions for recovered plastic can change unpredictably, quickly, and drastically. One operator expressed concern that companies may endanger themselves by investing heavily in hardware and facilities to recover certain materials — such as plastics like PET with a current healthy market — only for conditions to change again and leave them in an untenable position. While cliché, this underscores the importance of certainty to businesses, and should be considered in any future policy decisions made by the County.

[85] McDaniel, Piper (2019). As California's recycling industry struggles, companies and consumers are forced to adapt. Los Angeles Times. Retrieved January 7, 2020 from https://www.latimes.com/environment/story/2019-08-13/california-recycling-industry-plastics-china

[86] Ibid.

[87] Schussler, Anna (2018). Where does it go? The Daily Journal. Retrieved January 8, 2020, from https://www.smdailyjournal.com/news/local/where-does-it-go/article_ca096e96-b717-11e8-909a-5bd7c61b91ae.html

[88] Mahoney, Erika (2019). Global Recycling Changes Trigger Potential Garbage Rate Increase In Monterey. 90.3 KAZU. Retrieved January 8, 2020, from https://www.kazu.org/post/global-recycling-changes-trigger-potential-garbage-rate-increase-monterey#stream/0; Geha, Joseph (2019). Union City recycling rates increase as city leaders, recycler debate costs. East Bay Times. Retrieved January 8, 2020, from https://www.eastbaytimes.com/2019/08/30/union-city-recycling-rates-increase-as-city-leaders-recycler-debate-costs/

[89] Smith, Joshua Emerson (2019). Cities scrambling to clean up curbside recycling in wake of China ban. The San Diego Union-Tribune. Retrieved January 8, 2020, from https://www.sandiegouniontribune.com/news/environment/sd-me-recycling-revenues-fall-20190317-story.html

VI. analysis of plastic alternatives

Alternatives to plastic packaging have proliferated in recent years: Options for compostable packaging have expanded, particularly in the field of disposable food service ware, and several cities in California have enacted policies designed to increase usage of reusable items by food vendors and their customers. However, it cannot be assumed that any alternative will have lower impacts and better disposal options than plastic. It is therefore important for the County to evaluate the pros and cons of these options as it considers policy options to reduce plastic waste generation and litter.

In this section we focus on the two main categories of alternatives to single-use plastic food service ware: reusable ware and compostable disposables. With respect to the former we discuss how lifetime environmental impacts compare to plastics, the economic ramifications of increased adoption, and some important considerations unique to a transition to reusables. For the latter, we discuss the nature of compostable and biodegradable materials, including some specific types, and perform a similar comparison of the lifetime impacts of these products to plastics when used for food service ware. We identify particular challenges related to the disposal of such items and review the economic ramifications of increased usage.

Key Findings:

- Utilizing reusable food service ware in place of disposable options has the greatest potential to reduce the negative impacts associated with plastic waste in Los Angeles County, among the alternatives available.
- Increased adoption of compostable items may be beneficial, but many factors complicate selection of appropriate alternatives within this product category.
- Available evidence indicates that threats to businesses and the economy overall posed by transitions to plastic alternatives are small, if any. Available evidence suggests that food vendors may benefit fiscally following adoption of reusable items and that reducing plastic waste will lower costs on operators, municipal governments, and ratepayers. However, specific quantifiable predictions in this area are difficult to make.

Reusable Alternatives

Based on available information, increased usage of reusable ware in the Los Angeles County food service sector would likely be an unequivocal net benefit. Potential avenues for such a transition include more consistent usage of reusable items at dine-in food service locations, increasing the frequency with which customers purchase beverages in reusable cups or travel mugs, and adopting models that allow for food and beverage to be placed in reusable containers.

Reusable ware avoids many potential pitfalls and challenges posed by the need for disposal. With regard to environmental impacts, the available research strongly favors reusable food service items having lower impacts than equivalent disposable items over the course of a product's lifetime. More so than alternative disposable items, however, increased adoption of reusables would in many cases require investment in new equipment and reworking everyday practices by businesses, in addition to raising potential issues regarding compliance with health code in the case of customer-owned reusable items.

Table 2: Relative Impacts of Plastic Food Service Ware and Alternative Usage

				IMPACTS			
ALTERNATIVE OR RESTRICTION	EXAMPLE MATERIALS	USES	CHALLENGES	ENVIRONMENTAL	COST TO BUSINESSES (varies by product)	LITTER PREVENTION	WASTE PROCESSING COSTS (e.g., hauling rates, municipal contracts)
Plastic	PET; polypropylene	All disposable food service ware	Recovery & recyclability	■	■	■	■
Bioplastic	PLA; PHA	Cold beverage cups/lids; hot beverage cup linings; clam-shells; straws	Limited heat resistance; end of life disposal	■	$-$$	■	■
Upon Request	N/A	Utensils, straws, condiments	None	*	$	$	$
100% Fiber- based	Molded pulp; bamboo; bagasse	Clamshells; utensils; plates/ bowls/trays;	Grease; durability; absorption; chemical coatings (e.g., PFAS); end of life disposal	**	$	$	$$
Reusables (Customer-owned)	Stainless steel; polypropylene	Travel mugs; to-go boxes	Health code; cultural norms	***	$	$$	$$$
Reusables (Vendor-owned)	Plastic; Ceramic; Metal	Dining ware	Capital investment (infrastructure, dishwashing equipment, items); operating procedures	***	**Short-term:** $$$ **Long-term:** $$	$	$$$

Interpreting impacts: ■ indicates status quo.
Environmental benefits (e.g., reduced ecological harm, lower emissions) of scenarios compared to status quo:
* marginal improvement; ** moderate improvement; *** major improvement.

Economic impacts (e.g., purchasing costs, operating costs, municipal expenditures): **red** = increased costs; **green** = reduced costs.
$** small change; **$$** moderate change; **$$$ major change.

Comparative Life Cycle Impacts of Reusables

Across most environmental impact categories, existing research shows a consensus that a reusable food service ware product — given reasonable assumptions about its lifetime uses — will have a smaller footprint than disposable options. The exact break-even point can vary somewhat among product types, depending on production inputs and rates of loss, theft, or breakage. Estimates may also vary based on the exact methods researchers use. The main (but not exhaustive) categories by which reusables and disposables have been historically compared are greenhouse gas emissions, energy inputs, water use, ecosystem impacts, and solid waste generation.

Even accounting for varying methodologies, reusable items result in lower lifetime impacts than disposables. In one of the most heavily studied comparisons — ceramic coffee cups versus disposable paper or polystyrene cups — estimates on lifetime uses for the former to outperform disposables range from as low as 18 (vs paper) or 70 (vs polystyrene) to a few hundred.[90] To put these numbers in context, lifetime uses of dishware in a food service setting can be in the thousands.[91] It is also worth

[90] Sheehan, Bill (2017). Greenhouse Gas Impacts of Disposable vs Reusable Foodservice Products. *Clean Water Action/Clean Water Fund*. Retrieved December 12, 2019 from https://www.cleanwateraction.org/sites/default/files/CA_ReTh_LitRvw_GHG_FINAL_0.pdf

[91] City of Portland Sustainability at Work (2019). Reusable Dishware (Why switch?). *The City of Portland Oregon Sustainability at Work*. Retrieved December 12, 2019, from https://www.portlandoregon.gov/sustainabilityatwork/article/507480

noting that, as a general trend, more recent studies in this area tend to find lower break-even points — that is, reusables seem to become more advantageous compared to disposables over time. It is likely that increases in the energy and water efficiency of dishwashing processes bear some responsibility for this trend, and that it will continue as decarbonization of the electricity grid continues.[92]

In the case of other reusable food service ware items — including water containers, food clamshells, travel mugs, and utensils — reusables continue to exhibit lower lifetime impacts than functionally similar disposable products. While life cycle analysis research on these items is less prevalent than studies comparing ceramic mugs and disposable cups, what data is available tends to show greater benefits and lower break-even points for reusables in these categories. Lifetime uses for these products may need to be as low as 10-50 (plates and bowls), 15-30 (clamshells), or two (flatware/utensils) to be preferable to their disposable counterparts.[93] Findings of reusable preferability hold for items that are commonly customer-owned, such as plastic or stainless steel travel mugs and to-go food boxes made from materials like polypropylene.

Perhaps the most impactful effect of replacing disposable food service ware with reusables is in the area of solid waste. Past assessments and case studies have found that transitioning to reusables from disposables in both the food service sector and other areas (e.g., drinking water) drastically reduces weight and volume of solid waste generated.[94] In a case study (albeit from the early 1990s) of hospital food service, replacing disposable items with reusable dishes reduced solid waste generation by 99%.[95]

Despite available research consistently favoring reusable food service ware items over disposables in terms of lifetime environmental impact, there are two important caveats:

A. ***Impact Categories:*** While reusables generally outperform disposables in lifetime energy inputs and greenhouse gas emissions, other categories can deliver mixed results depending on the specific product. For instance, an assessment of reusable coffee containers by CIRAIG found that, while still a better option overall, travel mug impacts were similarly severe or worse in the Quality of Ecosystems and Water Consumption categories.[96] In particular, water usage associated with cleaning practices is an important consideration, though one that can be ameliorated through increased efficiency. Negative impacts of reusable products can also be lessened by adopting those that use less material in their manufacturing process while maintaining durability.

B. ***Public Events:*** Some studies have found mixed results when comparing the impacts of reusables versus disposables in certain settings. The primary example is public events, where comparisons of different food service ware cup options have yielded inconclusive results on which is most desirable from an environmental impact standpoint.[97] Small-scale

[92] Woods, Laura and Bhavik R. Bakshi (2014). Reusable vs. disposable cups revisited: guidance in life cycle comparisons addressing scenario, model, and parameter uncertainties for the US consumer. *The International Journal of Life Cycle Assessment* 19, 931-940. doi:10.1007/s11367-013-0697-7. Retrieved December 12, 2019, from https://link.springer.com/article/10.1007/s11367-013-0697-7

[93] Broca, Mita. (2008). A comparative analysis of the environmental impacts of ceramic plates and biodegradable plates (made of corn starch) using Life Cycle Analysis. *Department of Natural Resources TERI University.* Retrieved from http://sustainability.tufts.edu/wp-content/uploads/LifeCycleAnalysisPlasticPlatevsCeramic.pdf; Copeland, Audrey M., Alison A. Ormsby, Andrea M. Willingham (2013). Assessment and Comparative Analysis of a Reusable Versus Disposable To-Go System. *Sustainability: The Journal of Record* 6(6). https://doi.org/10.1089/SUS.2013.9832; Sheehan, Bill (2017). Greenhouse Gas Impacts of Disposable vs Reusable Foodservice Products. *Clean Water Action/Clean Water Fund*. Retrieved December 12, 2019, from https://www.cleanwateraction.org/sites/default/files/CA_ReTh_LitRvw_GHG_FINAL_0.pdf

[94] Franklin Associates (2009). Life Cycle Assessment of Drinking Water Systems: Bottle Water, Tap Water, and Home/Office Delivery Water. *State of Oregon Department of Environmental Quality*. Retrieved December 12, 2019, from https://www.oregon.gov/deq/FilterDocs/wprLCycleAssessDW.pdf; Keoleian, Gregory A. and Dan Menerey (1992). Disposable Vs. Reusable Systems: Two Source Reduction Case Studies. *Journal of Environmental Systems* 20(4), 343-357. doi: 10.2190/P25E-HNAE-7G81-JAPY.

[95] Keoleian, Gregory A. and Dan Menerey (1992). Disposable Vs. Reusable Systems: Two Source Reduction Case Studies. Journal of Environmental Systems 20(4), 343-357. doi: 10.2190/P25E-HNAE-7G81-JAPY.

[96] CIRAIG & Recyc-Quebec (2014). Life cycle assessment (LCA) of reusable and single-use coffee cups. *CIRAIG and Recyc-Quebec*. Retrieved December 12, 2019, from https://www.recyc-quebec.gouv.qc.ca/sites/default/files/documents/acv-tasses-cafe-resume-english.pdf.

[97] Vercalsteren, An, Carolin Spirinckx, Theo Geerken (2010). "Life cycle assessment and eco-efficiency analysis of drinking cups used at public events." *The International Journal of Life Cycle Assessment* 15(2), 221-230. DOI: 10.1007/s11367-009-0143-z. Retrieved December 12, 2019, from https://www.infona.pl/resource/bwmeta1.element.springer-9824e24a-4a37-3060-aee1-fa8ce403d519

events appear to be more conducive to effective reusable usage, but large events are an area where conclusions on best options cannot be drawn at this time, due to inconclusive data.

Economic Ramifications of Increased Reusable Adoption

Using reusable ware in the food service sector in place of disposables represents a large shift for many food vendors, one which can change their cost burdens significantly. The exact outcomes for any given business vary depending on a number of factors, but there are consistent trends and trade-offs that have been found.

Adoption of reusables shifts a food vendor's expenditures toward larger, up-front, one-time costs.[98] These come as investments in both reusable items themselves and in the equipment to clean them, the total costs for which can be thousands of dollars or more, depending on the size of the business. In contrast, disposable items impose a lower initial, but constant, recurring cost.

Available studies suggest that a transition from disposables to reusables typically leads to significantly lower expenditures for food service ware while slightly increasing costs associated with equipment, utilities, and labor on a per-meal or per-customer basis.[99] Recent case studies in both the private food vendor and public institution sectors show that, over time, adoption of reusables tends to result in net savings for vendors.[100] These direct cost savings for businesses can total thousands of dollars per year, with the fiscal break-even point occurring within the first year of the transition.

Additionally, businesses that adopt reusables tend to hire more personnel for dishwashing tasks, leading to more jobs and their associated macroeconomic benefits.[101] The reduction in solid waste production also has economic benefits, though these are difficult to quantify.

Other Considerations for Implementation

Because reusable food service ware requires a fundamentally different usage model, there are certain key aspects where they differ from other alternatives with regard to implementation.

A. ***Health Code Concerns:*** California Assembly Bill-619 was signed into law in July 2019, laying out rudimentary guidelines for how food vendors can accommodate customers bringing personal reusable food and drink containers in a sanitary fashion. However, based on conversations with government health officials, there are still concerns regarding compliance with health code when it comes to customer-owned reusables. Businesses may need to change their procedures and/or even the physical layout of their food preparation and pickup areas if they wish to facilitate customer-owned reusables usage, discussed further in item D below.

B. ***Equipment and Space Constraints:*** It may be difficult for some food vendors to utilize reusables and/or install dishwashing equipment due to physical space limitations or other facility attributes. Should the County desire that these businesses adopt reusables it may wish to facilitate potential workarounds, such as centrally located dishwashing facilities shared by multiple vendors or mobile dishwashing services.

C. ***Alignment and Disposal Advantages:*** Based on all available evidence, adoption of reusable food service ware in place of disposables is an unequivocal net environmental benefit. Compared to other types of alternatives, reusables are well-aligned with the County's stated sustainability goals. Reusables also have a logistical advantage in that disposal options are not a major consideration, given the reductions in solid waste generation that accompany

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98 Ellis. "Disposables versus reusables in foodservice operations." 7 March 2018. *Foodesign The Food Service Design Agency.* Retrieved December 12, 2019, from https://foodesignassociates.com/disposables-vs-reusables-food-service/

99 Keoleian, Gregory A. and Dan Menerey (1992). Disposable Vs. Reusable Systems: Two Source Reduction Case Studies. *Journal of Environmental Systems* 20(4), 343-357. doi: 10.2190/P25E-HNAE-7G81-JAPY.

100 City of Portland Oregon Sustainability at Work (2019). Restaurant Case Study. *The City of Portland, Oregon Sustainability at Work*. Retrieved December 12, 2019, from https://www.portlandoregon.gov/sustainabilityatwork/article/507590; Cioci, Madalyn (2014). The Cost and Environmental Benefits of Using Reusable Food Ware in Schools. *Minnesota Pollution Control Agency.* Document number: p-p2s6-16. Retrieved December 12, 2019 from https://www.pca.state.mn.us/sites/default/files/p-p2s6-16.pdf

101 City of Portland Oregon Sustainability at Work (2019). Restaurant Case Study. *The City of Portland, Oregon Sustainability at Work*. Retrieved December 12, 2019, from https://www.portlandoregon.gov/sustainabilityatwork/article/507590

their adoption. This gives them an advantage over single-use food service ware alternatives, given the complexity of finding environmentally beneficial end-of-life options for these products in the Los Angeles waste landscape.

D. ***Takeout and Delivery Food Service Challenges:*** Utilizing reusable ware in the context of takeout food or delivery orders presents additional challenges that may or may not be insurmountable in the short term, depending on the given food vendor. In the former case, both customer- and vendor-owned reusables are potential options. However, each has major caveats. Allowing customer-owned reusables would require institution of new spaces and practices by businesses to maintain sanitation requirements, with commensurate increases in time and labor involved. Alternatively, businesses could provide customers with food on reusable ware (e.g., a plate or tray) from which customers transfer the food to their personal containers and then return the transfer item. However, for businesses that currently use disposable food service ware, this would still require investing in these transfer items and the capacity to sanitize them between uses.

   The challenges of reusable utilization with delivery food service are more pronounced. The fundamental problem in this context is how to "close the loop" by ensuring that customers who have reusable to-go containers return them to the vendor for subsequent use. One possible solution is instituting systems whereby customers are charged a "deposit" for the reusable container which is refunded or credited to their next order when they return the container to the vendor. This would require investment by vendors in the containers themselves and the capacity to clean them, but this could be avoided were the role filled by a third party that supplies to-go containers to vendors while handling collection and sanitization. Such a model may be appropriate for third-party food delivery services (e.g., Postmates, DoorDash), which could incorporate reusables into their operating model with sufficient accommodations from vendors.

E. ***Incentivization Models Using Surcharges:*** One policy option currently enacted, or under consideration by a growing number of California cities, is to place surcharges on disposable food service ware items to incentivize reusable usage. Such policies have been supported in other major urban areas: A San Francisco survey conducted by the Clean Water Fund found that 77% of respondents would support an ordinance that mandated a surcharge on disposable cups to reduce waste and litter.[102]
   There is concern among many food vendors that they will lose customers if forced to mandate a surcharge on certain single-use items, but available survey data and qualitative data provided by interviewed city officials indicate that this is likely a small risk.[103] Universal applicability of such a policy would likely further minimize any transference of business by customers to competitors. However, given the recency with which surcharge policies have been enacted, implementation is ongoing and no quantitative data on the efficacy of these policies is available. It is therefore difficult to determine how the policy would affect consumer behavior in reality.

Compostable and Biodegradable Alternatives

The issue of compostable and biodegradable materials is highly complicated. This complexity makes it difficult to draw firm conclusions about the net impacts of replacing single-use plastic food service ware with compostable or biodegradable alternatives in Los Angeles County. Based on interviews with waste industry consultants, composting facility and anaerobic digester operators, manufacturers, and certifying institutions, the main findings in this area are:

1. While no compostable material can be considered an ideal candidate for food service ware in the County at this time, displacement of single-use plastic food service ware with compostable products will likely produce some benefits. 100% fiber-based

[102] Clean Water Action/Clean Water Fund. (2016). *Reducing Litter and Achieving Zero Waste by Charging for Take-Out Cups A Survey of Customer and Café Behaviors and Response to a Proposed Ordinance in San Francisco.*

[103] Ibid.

items that are free of per- and polyfluoroalkyl (PFAS) or other chemical coatings and which are manufactured from agricultural byproducts appear to be the best option. Evidence suggests that usage of such products will increase food waste diversion rates, reduce the burden on solid waste disposal systems, and degrade more readily should the items be littered. These items are also more conducive to being integrated into composting operations than bioplastic equivalents.

2. There is a major disconnect between the specifications of products being certified and manufactured and what is compatible with composters and digesters in the Los Angeles region. It may be helpful to consider potential steps that public agencies can take to bridge this gap. Such efforts could assist in creating more viable end-of-life disposal options for compostable materials, whether for food service ware or other product categories.

Defining Compostable and Biodegradable

In considering plastic alternatives it is important to distinguish between what defines "compostable" versus "biodegradable" products. In the context of packaging these are technical terms, whose definitions are linked to specific certification standards. These standards are contingent on materials being in the right environment, such as a composting facility, which meets requisite requirements for moisture level and temperature in the item's environment. Items of this nature that are littered, therefore, are almost never in the ideal environment to break down. Some materials may do so, but the time frame required will be significantly longer than in a composting facility.

The primary certifying body for compostable and biodegradable products in the United States is the nonprofit Biodegradable Products Institute (BPI). BPI certifications were originally developed in conjunction with the United States Composting Council and are based on a set of standards called ASTM (American Society for Testing and Materials) D 6400 and ASTM D 6868. The certification process tests products across numerous criteria, including timeframes necessary for physical disintegration and biodegradation, plant toxicity, and heavy metals.

The key difference between biodegradable and compostable products, as defined in ASTM standards, is the result of degradation. Biodegradable items may leave certain undesirable residues at the end of their breakdown process. In contrast, compostable materials break down to organic matter. Compostable is therefore a more stringent standard.

All BPI-certified compostable products meet the same standard, regardless of their specific material type. In addition to the requirements regarding toxicity and potential contaminants, the two most pertinent aspects of the certification are:

1. ***Disintegration:*** The product must degrade into small pieces (no more than 10% by weight exceeding 2 millimeters in size) within 90 days.[104]
2. ***Biodegradation:*** The product must chemically degrade (90% absolute biodegradation) within six months.[105]

Major Categories of Compostable Materials

There are several different types of materials that can be used to manufacture compostable food service ware:

A. ***Paper:*** A familiar material that can be used to manufacture a variety of products. However, some paper-based products such as cups for hot liquids may contain additional coatings or chemicals.

B. ***Fiber-based:*** Material made from the fibers of plants such as sugarcane, sorghum, and bamboo. Some types, such as molded pulp or bagasse, are manufactured from the leftover material produced by agriculture, lowering overall impacts. Such containers may have coatings of other materials or chemicals when intended for liquids.

C. ***Bioplastics:*** Plastic resins made from plant materials. The most common type is polylactic acid (PLA). These substances can be used to make entire products (e.g., clear drinking cups almost indistinguishable from PET) or in combination with other materials (e.g., a PLA coating inside a paper cup).

[104] Biodegradable Products Institute (2019). BPI Certification Scheme. *Biodegradable Products Institute*. Retrieved December 12, 2019, from https://bpiworld.org/resources/Documents/BPI_Certification_scheme_2019.pdf

[105] Ibid.

Comparative Life Cycle Impacts of Compostable Food Service Ware

Existing research on the life cycle impacts of compostable food service ware compared to non-compostable products paints an unclear picture. Studies vary considerably in what products they compare, what scenarios they consider, and what impact categories they examine, making side-by-side comparisons difficult.

A 2009 assessment comparing PLA, PET, and polystyrene (PS) clamshells found that PS was preferable to PLA across most impact categories, including global warming, air pollution, and impacts on aquatic environments.[106] However, this study was narrowly focused and did not consider some negative ecological impacts associated with PS, such as the detrimental effects to wildlife that inadvertently consume the material. In contrast, another study, published in 2008, focused on starch-based biodegradable and compostable versus single-use plastic cutlery. In this instance, the compostable alternative was found to have significantly lower impacts across all categories, including greenhouse gas emissions, solid waste generation, and eutrophication.[107] While these are only two examples, they illustrate the difficulty of making firm conclusions regarding whether increased compostable food service ware usage will be an environmental boon or not. More research is needed on the environmental impacts of compostable products, but studies conducted so far tend to focus on bioplastics. Other categories of compostable products are even less well-examined.

A 2017 report by Wageningen Food & Biobased Research in the Netherlands succinctly outlines how assessing compostable products' life cycle impacts is complicated by how one values certain categories of environmental impacts. In discussing the role of bioplastics:

> "Substitution of fossil-based plastics by bio-based plastics generally leads to lower non-renewable energy use (NREU) and greenhouse gas (GHG) emission. The GHG emission reduction, however, may be negatively influenced by direct and/or indirect land-use change.... For the categories related to agriculture, such as eutrophication and acidification, bio-based plastics generally have a higher impact than fossil plastics.... No absolute rule can be given."[108]

One of the most thorough reviews of extant research on this topic is the 2018 report by Franklin Associates to the Oregon Department of Environmental Quality.[109] Across numerous impact categories — including global warming impact, land occupation, eco- and human toxicity, and aquatic impacts — compostable food service ware products were found to perform worse, in every one. A major driver of the highest-impact categories for compostable products was their production phase. The analysis also found that, depending on the exact scenario, disposal of compostable food service ware through composting may generate the same or greater impacts than other disposal options.

However, it is notable that only seven studies were considered in reaching these conclusions, underscoring the relative dearth of available research analyzing life cycle impacts of compostable food service ware. Additionally, in casting the proverbial wide net, the authors included some older studies that may not be reflective of current conditions.[110] This report also faces shortcomings with regard to distinguishing among categories of compostable materials; in particular, fiber-based materials made from agricultural byproducts are a notable category whose production impacts would be significantly lower than compostable products made from dedicated crop stocks. Widespread adoption of such materials

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[106] Madival, Santosh, Rafael Auras, Sher Paul Singh, Ramani Narayan (2009). Assessment of the environmental profile of PLA, PET, and PS clamshell containers using LCA methodology. Journal of Cleaner Production 17(13), 1183-1194. DOI: 10.1016/j.jclepro.2009.03.015

[107] Razza, Francesco, Maurizio Fieschi, Francesco Degli Innocenti, Catia Bastioli (2008). Compostable cutlery and waste management: An LCA approach. Waste Management 29(4), 1424-1433. DOI: 10.1016/j.wasman.2008.08.021.

[108] van den Oever, Martien, Karin Molenveld, Maarten van der Zee, Harriette Bos (2017). Bio-based and biodegradable plastics - Facts and Figures. Wageningen Food & Biobased Research number 1722. http://dx.doi.org/10.18174/408350

[109] Mistry M, Allaway D, Canepa P, and Rivin J (2018). Material Attribute: COMPOSTABLE – How well does it predict the life cycle environmental impacts of packaging and food service ware? State of Oregon Department of Environmental Quality. Retrieved December 12, 2019, from https://www.oregon.gov/deq/FilterDocs/compostable.pdf

[110] Allaway, J., M. Rivin, M. Mistry, P. Canepa (2019). Environmental Impacts Of Packaging Options. Biocycle 60(3), 30. Retrieved December 13, 2019, from https://www.biocycle.net/2019/03/11/environmental-impacts-packaging-options/

would contribute to the formation of a circular packaging economy, with estimated equivalent benefits in the hundreds of billions of dollars.[111] It is therefore important that the County consider compostable alternative materials on their individual merits as opposed to data generalized across the diverse compostable products sector.

A final major factor to consider is the role of compostable food service ware in the food waste stream. The environmental footprint of food and its associated waste dwarfs that of food packaging, particularly with regard to climate-related impacts.[112] Packaging design and materials can play a significant role in reducing food waste and increasing landfill diversion. Even small differences in wasted food resulting from the type of packaging used can dominate impact differences associated with the packaging itself.[113] This means that, from an environmental perspective, packaging that uses more material may be preferable to minimalist packaging if the bulky packaging leads to lower amounts of residual, non-consumed food. Furthermore, use of compostable food service ware by food vendors has been linked to higher rates of food waste capture, which would likely assist the County in complying with regulations set forth by Senate Bill 1383 regarding organic waste disposal.[114] While the referenced study does not establish a causal relationship between compostable usage and food waste diversion, one possible explanation is that the use of compostable materials prompts customers to dispose of both packaging and food waste together in an organic waste receptacle.

End-of-Life Disposal Considerations

Ensuring that desirable end-of-life options exist for compostable items in Los Angeles County is currently a difficult proposition. Challenges related to disposal, in turn, have consequences for a product's lifetime environmental impacts. The question of disposal is thus one of the primary confounding factors that makes it challenging to assess the magnitude of potential benefits arising from displacing single-use plastics with compostable materials in the County.

However, even when ideal outcomes are not achieved (e.g., a compostable item becomes litter or is sent to a landfill), there are marginal benefits to be had by transitioning from single-use plastic food service ware to those that are compostable. Nonbioplastic compostable products will break down in a landfill setting — though the rate at which they do so varies depending on individual landfill conditions — reducing the solid waste burden on facilities compared to plastics.[115] This process is known to contribute to greenhouse gas emissions, particularly through production of methane via anaerobic decomposition of organic material.[116] However, emissions production can be ameliorated using various strategies, including aerobic landfill operation and capture and combustion of gas.[117] Furthermore, recent research has found that plastics can also produce methane and other hydrocarbon gasses during degradation, suggesting that the relative emissions profiles of plastics and organics during their disposal stage are more similar than historically thought.[118] With regard to a littering scenario, conversations with experts indicate that fiber-based products will degrade in the natural environment significantly faster than plastics, though not nearly as quickly as they would in conditions created in a composting facility.

The primary challenges related to disposal of compostable materials are:

A. ***Feasibility of Degradation:*** The primary concern

[111] Guillard, V., Gaucel, S., Fornaciari, C., Angellier-Coussy, H., Buche, P., & Gontard, N. (2018). The Next Generation of Sustainable Food Packaging to Preserve Our Environment in a Circular Economy Context. Frontiers in nutrition, 5, 121. doi:10.3389/fnut.2018.00121.

[112] Suggitt, Jackie (2018). The link between food waste and packaging. GreenBiz. Retrieved from https://www.greenbiz.com/article/link-between-food-waste-and-packaging

[113] Wilkstrom, F., H. Williams, G. Venkatesh (2016). The influence of packaging attributes on recycling and food waste behaviour — An environmental comparison of two packaging alternatives. Journal of Cleaner Production 137, 895-902. http://dx.doi.org/10.1016/j.jclepro.2016.07.097.

[114] Ekart, Dale and Kate Bailey (2019). Maximizing food scrap composting through front-of-house collections at food establishments. Eco-Cycle. Retrieved December 13, 2019, from http://www.ecocycle.org/files/pdfs/Reports/front-of-house-composting-study-ecocycle.pdf

[115] Lou, X.F., and J. Nair (2009). The impact of landfilling and composting on greenhouse gas emissions - A review. Bioresource Technology 100(16), 3792-3798. https://doi.org/10.1016/j.biortech.2008.12.006.

[116] Ibid.

[117] Ibid.

[118] Royer S-J, Ferrón S, Wilson ST, Karl DM (2018). Production of methane and ethylene from plastic in the environment. PLoS ONE 13(8): e0200574. https://doi.org/10.1371/journal.pone.0200574.

with compostable materials expressed by four of four composting and organic disposal operators interviewed (three in Southern California, one in Northern California) is that products do not disintegrate in the timeframes necessary for their business model. The 90-day disintegration standard met by products certified by BPI is insufficient for many facilities, which may operate on cycles as short as five weeks and an average of approximately 60 days. Additionally, operators indicated that inconsistency of conditions with regard to moisture, temperature, and oxygen availability can lead to compostable materials not performing as certified.

None of the three Southern California-based composting operators currently accept compostable packaging (other than food-soiled paper, which is required by law). One Northern California-based facility indicated that it does compost materials like PLA bioplastic, but that it requires the material to be screened and reintroduced for multiple composting cycles, illustrating the difficulties posed by processing such items. Another operator discussed a facility outside the state where PLA is readily handled thanks to the high temperatures the facility maintains. Overall, experts on the Southern California waste landscape highlighted 100% fiber-based products as the best existing option for being processable, as they would be the least disruptive to their current operations. Products that are more lightly constructed also tend to break down faster.

In the case of anaerobic digesters (ADs) — facilities that process organic waste to create natural gas for energy production — compostable products create other challenges. Mainstream ADs typically process a highly liquid slurry that is primarily composed of food waste, making solid packaging material undesirable. High-solids ADs process solid organic material like leaves in conjunction with food waste, making compostable packaging marginally more processable by such facilities. However, in both cases, compostable packaging represents a loss of output, and therefore a loss of income, for the facilities. Compostable packaging, especially bioplastics like PLA, is nitrogen-poor and low in energy content. Any amount of compostable packaging processed by an AD displaces an equivalent amount of organics that would produce more natural gas, and as such it is counterintuitive for digesters to process such material. However, there are no significant technical barriers, meaning that operators could process compostable products with appropriate incentives.

B. ***Separation of Contaminants:*** All Southern California-based operators interviewed (three of three) indicated that there are issues with efficiently separating compostable products from noncompostable ones. In many cases, the products are indistinguishable at a glance. This is especially true with bioplastics, which often bear significant resemblance to traditional plastics like PET. Therefore, operators separate all packaging as a rule because they do not have the time and resources to filter items reliably. In response to this issue, composting operators indicated that thorough, obvious labeling that is consistent on a region or even statewide basis would likely be helpful. Multiple industry experts have recommended as a model Washington State's House Bill 1569, which requires labeling for compostable products that is "distinguishable on quick inspection" while prohibiting deceptive labels on products that are not environmentally friendly.[119]

C. ***Organic Certification and Markets:*** Organic farms are a key market for many California-based composting facilities. Even when destined elsewhere, composters value an organic certification for their compost product as a testament to its quality. The standards for organic certification are set by the Organic Materials Review Institute (OMRI). These standards do not currently address the incorporation of compostable material into the compost waste stream, meaning that facilities that do so perceive a risk of losing their certification. As a result facilities are erring on the side of caution by excluding compostable materials. This exclusion applies to both bioplastics and fiber-based or paper-based products, the latter of which may have chemical or

[119] H.B. 1569, 2019-20 Biennium, 2019 Reg. Sess. (Wash. 2019).

plastic coatings and treatments. The one operator interviewed that indicated it currently composts PLA and other compostable materials stated that it maintains two separate waste streams, one organic and one nonorganic.

BPI is currently working to have include compostable materials in OMRI standards, which could potentially remove this barrier. However, at this time, the concerns of composters regarding organic certification is a significant source of reluctance to accept compostable materials.

D. ***Item Composition:*** Some types of compostable products may be manufactured with PFAS chemicals. Two interviewed operators noted this as a particular problem with fiber-based products. PFAS compounds have come under increased scrutiny in recent years due to concerns about their impacts on human health, which may include immunological problems and carcinogenic impacts.[120] Given that agriculture is the primary market for composters in California, PFAS contamination is a threat from both business and public health standpoints. Operators expressed the need for greater transparency on the part of manufacturers regarding what their products contain. BPI is implementing a new standard for certified compostable food service ware that will prohibit inclusion of PFAS chemicals.

Economic Considerations

Adoption of compostable food service ware in place of other disposables does not significantly change the business model for food vendors but it would likely result in increased expenditures for food service ware items. Compostable items are generally more expensive than plastic equivalents, such as those made from PET or polystyrene foam, across all categories. However, assuming a reasonable adjustment period, a transition to compostable products is unlikely to cause significant economic disruption. This conclusion is based on the following considerations, with information derived largely from interviews with eight California cities that have enacted policies restricting plastic food service ware items and three compostable product manufacturers.

1. ***Past Experience:*** Policies restricting certain types of plastic food service ware have been enacted in over 100 California cities and counties, and at this time no instance of a food vendor shuttering due to the effects of such a policy has been identified. Most policies of this type have historically included language allowing businesses to apply for exemptions due to economic hardship. Of the eight cities interviewed a majority never received any exemption applications, and only one has granted any exemptions. The argument has been made, however, that businesses are reluctant to engage with the exemption process due to the information they are required to provide, and that therefore the lack of exemption applications may not be reflective of true conditions.
2. ***Small Magnitude Per-Unit Cost Increases:*** While the relative cost increases for compostable items on a per-unit basis can be proportionally high in some categories compared to plastic items, these increases are typically less than 5 cents per item and may be fractions of a cent for small items like straws and utensils. This suggests that businesses can, if need be, pass these minor cost increases on to their customers. Additionally, the item types with the highest proportional per-unit cost increase are those that have been subject to "upon customer request" issuance requirements in previously enacted policies, reducing the fiscal impact on businesses by lowering the quantities of such items used. These considerations are discussed in more depth with respect to expanded polystyrene products below.
3. ***Market Conditions:*** According to compostable product manufacturers, market conditions in the Los Angeles region are such that economic disruption from new adoption of compostable food service ware would be minimal. This is primarily thanks to the presence of many suppliers, driven in large part by the recent uptick in demand and changes in consumer preference toward compostable products. Current market conditions are therefore consumer-favorable with regard to prices and providing sufficient supply to meet increased demand.

There can also be notable economic benefits for busi-

[120] Cohen, Albert M (2019). PFAS Under Increased Scrutiny in California. *Lexology.* Retrieved December 13, 2019, from

nesses of utilizing compostable food service ware. A case study of a Seattle-based restaurant chain that transitioned to 100% compostable service ware showed that it has seen significant positive effects since switching to compostable service ware, including increased brand awareness and a growth in sales of 47% between 2010 and 2015.[121] The business was also able to increase the amount of compost it generated from approximately 200 tons in 2011 to over 1800 tons in 2015.[122] Adoption of a single-bin system was reported to have reduced confusion among customers and resulted in lower costs associated with collection and disposal. This strategy may have the potential to produce significant long-term savings with regard to waste collection if adopted in Los Angeles County.

Plastic Alternatives

There are limited situations where transitioning from one type of plastic food service ware item to another type of plastic is beneficial. An example of such a transition would be shifting from PS or EPS to PET. Doing so could be a means of minimizing the usage of resins that have particularly harmful human health or environmental impacts. However, the aforementioned difficulties with recovering and recycling plastic food service ware, regardless of its resin type, would remain.

Price Comparison of Expanded Polystyrene Versus Alternatives

Pricing of expanded polystyrene food service ware versus other disposable alternatives bears special mention. Expanded polystyrene products have been the most commonly restricted plastic material in California, due in large part to their notable negative impacts on marine ecology, challenges for recycling, and impacts on human health. However, these products have a reputation as the cheapest option available to many food vendors for disposable ware, and the California Restaurant Association expressed concern that transitioning to alternatives would be fiscally infeasible for many food vendors in Los Angeles County.

One of the most thorough studies of relative pricing between expanded polystyrene and alternative material food service ware items was conducted by Cascadia Consulting Group in 2012. This assessment preceded a potential expanded polystyrene ban in the City of San Jose and focused on the economic effects on businesses.[123] This study gathered data from several different food service ware suppliers and reported the lowest cost they found for expanded polystyrene and alternatives. Alternatives included other plastics besides expanded polystyrene, fiber-based products, and PLA products.

Regarding clamshells, Cascadia found the lowest-priced alternative to be other plastics, with the price difference ranging from $0.05 to $0.26 greater than expanded polystyrene. For cold cups, the difference between expanded polystyrene and fiber-based cups was extremely small, with the cost for fiber cups to be only $0.003 to $0.01 greater than expanded polystyrene cold cups.[124] Fiber-based hot cups were found to be cheaper than expanded polystyrene cups in some cases, with a price difference between $0.017 less and $0.009 greater than expanded polystyrene. The difference for fiber-based plates was between $0.01 less and the same price as expanded polystyrene plates.[125]

These results show that the price differential between expanded polystyrene and alternative food service ware is quite small and, in some cases, alternatives are actually cheaper. Additionally, prices for alternative products have been trending downward in recent years thanks to economies of scale and increased popularity, indicating that price differentials may be smaller now than when this study was conducted in 2012. In conversations with compostable manufacturers, many noted how their products have become more affordable over time.

Additionally, a 2012 report done by Economic & Planning Systems for the City of San Jose analyzed the economic impact of expanded polystyrene bans on restaurants and

[121] NatureWorks | Taco Time Embraces Seattle Waste Ordinance. (n.d.). Retrieved December 16, 2019, from https://www.natureworksllc.com/In-geo-in-Use/CaseStudies/Taco-Time-Embraces-Seattle-Waste-Ordinanc

[122] Ibid.

[123] Cascadia Consulting Group. (2012). *EPS Food Service Ware Alternative Products - An Evaluation of Costs and Landfill Diversion Potential.*

[124] Ibid.

[125] Ibid.

found no severely detrimental effects of existing bans on the restaurant industry.[126] There were no reports of any food establishment going out of business because of an expanded polystyrene ban and, while most cities offered some form of financial hardship exemption, no financial hardship applications were reported. Scenario analysis of profit margins for full- and limited-service restaurants found no case in which an establishment would have a post-ban profit margin below zero, suggesting that while the cost increase will impact food vendors using expanded polystyrene, the impact is of insufficient magnitude to render the vendor financially unsustainable.[127] Furthermore, analysis of customer elasticities in response to price increases at restaurants found that there is generally an inelastic customer demand to price increases and a generally elastic demand for different restaurants.[128] This means that any increase in prices instituted by a food vendor to cover increased food service ware costs would likely not result in a significant reduction in customers.

[126] Economic & Planning Systems, Inc. (2012). *Economic Impact Analysis of EPS Foodware Costs*.
[127] Ibid.
[128] Ibid.

VII. policy process and design lessons from cities with existing plastics policies

In California, 135 cities and counties have adopted ordinances related to single-use plastic reduction.[129] We performed extensive research to better analyze the history and effectiveness of these policies. To further evaluate existing regulation in the state, we conducted a series of eight interviews with city officials who have implemented plastic policies to gain more insight into the policy process and design, as well as the lessons learned from their experience. To enhance the quality of information obtained, identities of city officials remain confidential throughout this report.

In this section, we provide background information relating to the general history of California plastics regulation both statewide and citywide, notably concerning plastic bags and polystyrene/expanded polystyrene ordinances. Next, we discuss our qualitative city interview findings, first examining respective policy development and rationale then transitioning to policy implementation. Transition periods, the stakeholder engagement process, and public education are the specific focuses of analysis here. Once development and implementation are identified, we discuss cities' policy execution including challenges and areas for improvement, post-policy effects and subsequent impacts on affected businesses.

Key Findings:

- Plastic bans have been proved to be effective at reducing plastic waste, with results from Senate Bill 270's plastic bag ban revealing a significant decrease in plastic bag use in California.
- All (eight of eight) city interviewees noted negative environmental impacts and litter as the two main rationales behind all respective plastic ordinances.
- The lack of recyclability for many plastics, especially polystyrene, was an added justification by many cities.
- Policy enforcement proved to be the main challenge for many early-adopter cities.
- No negative effects were reported by any city official we interviewed post-implementation of their policy.

SB 270 Sets a Plastic Precedent in California

Historically, policies designed to reduce plastic waste in California have predominantly focused on two categories of products: lightweight plastic bags and polystyrene. Plastic bag bans were first implemented in various cities throughout the state in 2008 and have become highly publicized in years since.[130] Due to the positive effects of these citywide initiatives, California became the first state to pass a Single-Use Carryout Bag Ban (SB 270) in 2016, with close to 150 cities having already adopted some sort of plastic bag restriction prior to the statewide rule.[131] SB 270 prohibits grocery stores, certain retail stores, convenience stores, and liquor stores from providing single-use plastic carryout bags to customers. In lieu of plastic, the affected stores can instead provide

[129] (C. Cadwallader, personal communication, January 6, 2020)
[130] List of Local Bag Bans. (n.d.). Retrieved December 16, 2019, from https://www.cawrecycles.org/list-of-local-bag-bans
[131] Single-Use Carryout Bag Ban (SB 270). (n.d.). Retrieved December 16, 2019, from https://www.calrecycle.ca.gov/plastics/carryoutbags

customers with a reusable tote or recycled paper bag for a minimum of 10 cents.[132]

A post-evaluation study conducted by CalRecycle reveals significant reduction rates for plastic bag usage as a result of the policy.[133] Within a six-month period, close to 66 million reusable bags and 45 million recycled paper bags were reportedly sold to customers post-SB 270.[134] In contrast, approximately 435 million single-use plastic bags and 116 million paper bags were sold to customers before policy implementation.[135] These numbers represent an 85% decrease in the number of plastic bags distributed and a 61% decrease in the number of paper bags distributed to customers.[136]

Positive effects were observed regarding litter reduction as well. Pre-policy, 8-10% of littered items collected in California were paper or plastic bags. In 2017 post-policy, the percentage of plastic and paper bags collected decreased to 3.87% of the litter stream.[137] A report released by UCLA in partnership with the City of Los Angeles Bureau of Sanitation estimated that close to 11,400 tons of litter will be diverted in 2020 alone as a result of the plastic bag ban.[138] These findings demonstrate that large-scale bans on products or materials are effective in reducing plastic waste and litter.

Single-Use Plastic Regulation in California Cities

In addition to plastic bag bans, several cities have adopted other policies to reduce plastic including, but not limited to, bans on latex ballons, expanded polysterene, and plastic straws (or straws provided upon request only). In California, there are currently 135 local ordinances, either city or countywide, restricting plastics. Historically, the majority of these policies have focused on expanded polystyrene or polystyrene products (see Appendix A and C).[139] Many of these policies have been in place for a long time, with Berkeley being the first city to pass an expanded polystyrene ban in 1988.[140] Within L.A. County, 13 cities have an expanded polystyrene or polystyrene ban (see Appendix B). Several cities have transcended an initial expanded polystyrene ban and implemented more stringent policies concerning single-use plastics. The development of recent ordinances has demonstrated city/county efforts to dramatically reduce regional waste and develop more sustainable solutions to the challenges posed by plastics.

Interviews With City Officials

We conducted eight interviews with California city officials who have enacted stringent single-use plastic reduction policies in order to gain insight into respective processes and lessons learned. Officials from five cities in Los Angeles County were interviewed in addition to officials from three cities outside the County. Information was gathered regarding policy development, implementation, and execution processes. We were also able to gather information related to post-policy effectiveness and current challenges/areas for improvement.

1. ***Policy Development and Respective Rationale:*** We sought to understand the rationale behind these policies to further determine initial purpose and ultimate effectiveness. Unsurprisingly, litter and its subsequent impact on marine environments was noted as primary motivation for policy development from all city representatives, most crucially by the two coastal cities that were interviewed. Economic interests were additionally referenced by all, either related to cleanup costs or tourism revenue loss concerns.

   A lack of recyclability for many plastics, especially polystyrene, was cited as additional policy justification by several cities. Officials discussed the lack

[132] Ibid.
[133] *SB 270 Report to the Legislature: Implementation Update and Policy Considerations for Management of Reusable Grocery Bags in California. (2019, February 25), 40.*
[134] Ibid.
[135] Ibid.
[136] Ibid.
[137] Ibid.
[138] *City of Los Angeles Zero Waste Progress Report (2013).* (p. 48).
[139] Table View PS Ordinance. (n.d.). Retrieved December 16, 2019, from https://www.cawrecycles.org/psordinancetable
[140] Berkeley11.pdf. (n.d.). Retrieved from https://www.codepublishing.com/CA/Berkeley/html/pdfs/Berkeley11.pdf

of a market for polystyrene and others, stressing economic inefficiency for local recovery facilities to recycle the material. While a few officials stated that the negative impacts of plastic on human health were a topic of discussion, only one city official stated that health-related impacts were enough of an impetus for policy implementation. Notably, however, a handful of cities agreed that a reduction in negative health impacts would prove an added benefit resulting from the policy.

2. ***Policy Implementation:*** Many cities proved to share similar policy implementation processes including transition period mandates, extensive stakeholder engagement, and education/awareness campaigns.
   a. ***Transition Periods:*** All cities interviewed granted a minimum six-month "grace period" in order to give businesses enough time to use up their current stock of products and to develop a plan for transitioning to compliant alternatives. This delay allowed for internal adaptation, especially concerning subsequent modifications to business operations. For one city, the transition period proved much longer (almost triple in length) and was strongly advised against. For the cities with the most stringent plastic policies, many employed a phase-in approach comprising an initial policy that banned only expanded polystyrene or polystyrene food service ware, for example, then a second phase banning the retail sale and distribution of most polystyrene products.
   b. ***Stakeholder Engagement Process***: Several cities took a proactive approach to the stakeholder engagement process. Pre-policy implementation, many officials noted citizens and businesses were provided with ample resources needed to understand the purpose of the policy as well as the relevant details and timeline. Once passed, many cities sent mailers to all affected stakeholders to raise awareness of initial policy implementation. Workshops were also used as an educational tool, providing businesses with compliant product samples or brochures including a list of compliant materials by product category. One unique strategy described was the creation of an explanatory video for affected businesses, distributed along with a brochure of compliant products.
   c. ***Public Education and Awareness:*** Public education and outreach were a top priority for all city officials interviewed. To maximize public awareness, several city teams created explanatory flyers in multiple languages for diverse constituents. The majority of the cities stated that the public reception has been mostly positive and that most people in the community have been in favor of the ordinance. Several mentioned that their citizens welcomed the ordinance as they wanted to help make a positive impact on their community.
3. ***Challenges and Areas for Improvement:*** City officials expressed a shared primary challenge concerning policy enforcement. Ensuring compliance for businesses proves difficult and demanding considering the sheer number of firms and varieties in one region. With a lack of resources notably including time and staff, most cities have been unable to monitor compliance. Instead, many city officials interviewed rely on a simple complaint-based system, transferring responsibility to local customers and employees. One city allows citizens to report violations through an app, making the complaint process easy and convenient.

   The city exhibiting the strictest enforcement system has an inspector personally "audit" every restaurant to ensure businesses are complying with the ordinance. Yet due to the time-consuming process that this requires, inspectors have yet to visit every affected establishment after more than two years since the policy's enactment date.

   Additionally, challenges regarding city borders were raised, particularly when neighboring cities do not have a policy in place. Food truck vendors are especially impacted in this capacity and compliance assurance is nearly impossible given that many vendors cross city borders daily. Multiple officials also noted that although they have seen positive effects from their respective policies, due to variability by city, confusion for citizens and businesses can ensue.

Another issue discussed was the preferred alternative to the banned food service ware materials. While one city official cited 100% fiber-based as a preferred alternative, another was concerned that these products can contaminate the recycling stream if not disposed of correctly. However, it is unlikely that such products would represent a marginal increase in the contamination of recycling compared to the status quo, even in a worst-case scenario.

4. ***Policy Execution and Effects:*** It is important to note, for the purpose of this report, that we were unable to access city-specific quantitative data pertaining to post-policy effects of respective ordinances. Although statistics are limited, city officials observed a reduction in litter based on anecdotal evidence, especially with regard to polystyrene. This information has not been historically tracked by municipalities, in part due to logistical difficulties, and information available through nongovernmental organizations can be inconsistent in its methodology.

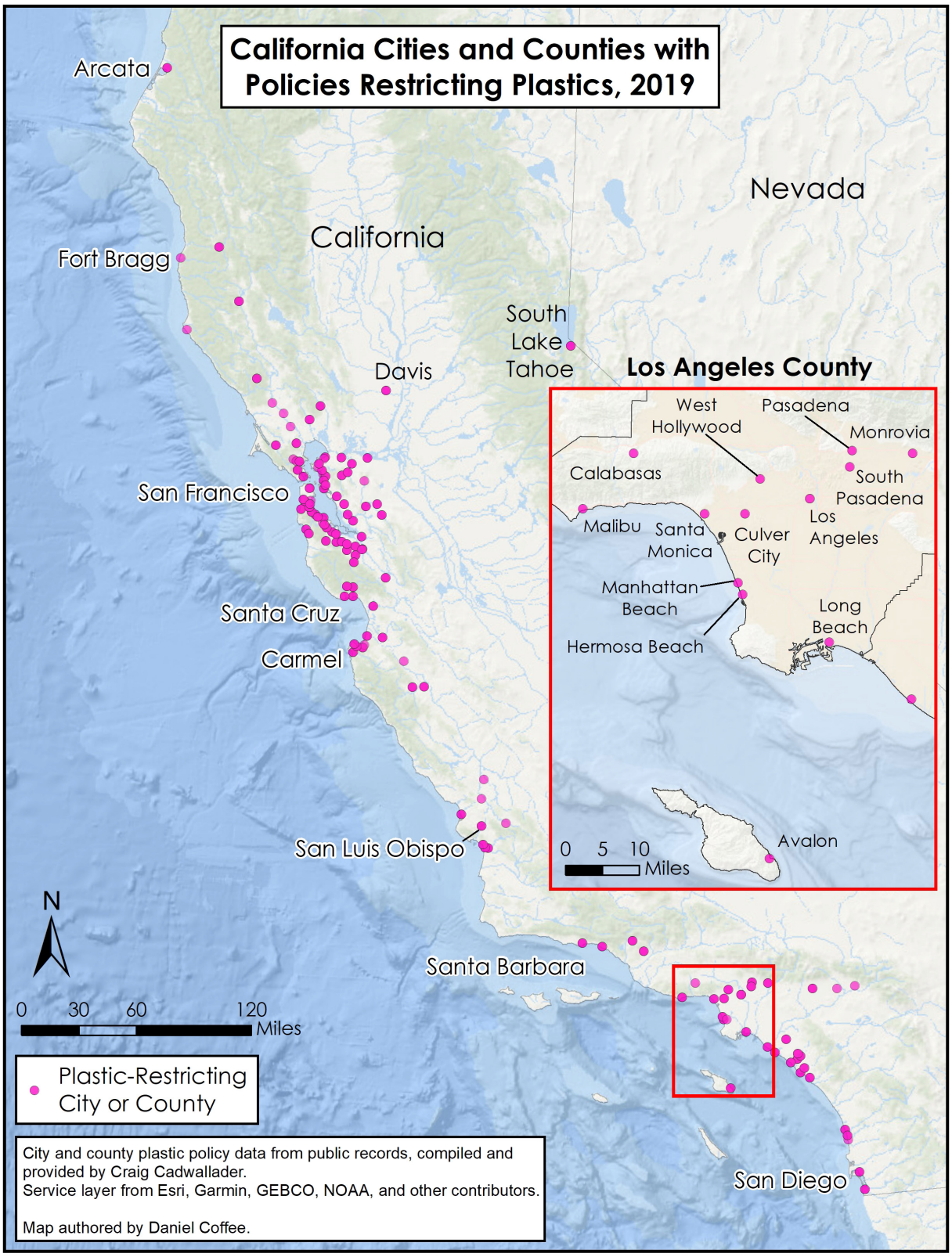
   The lack of quantitative litter data pre- and post-policy proved a common issue for many officials we spoke with, making it difficult to accurately assess how effective the policy has been at reducing plastic waste.

5. ***Economic Impact on Affected Businesses:*** Given that these policies directly impact local firms, impacts on affected businesses were top of mind for a majority of the city officials interviewed. Seven of the eight cities interviewed currently offer a financial hardship waiver for businesses, allowing them to express a state of financial distress and need for additional time to purchase compliant product alternatives. A request for an exemption must be filed in writing and sent to the appropriate city manager, along with documentation that proves financial hardship in order to be considered. The only city interviewed that did not include a financial hardship waiver in its ordinance conducted an alternative cost-evaluation study, concluding that only high-volume food providers exclusively using expanded polystyrene would be significantly impacted. This city further determined these vendors to be outliers.

   Our study ultimately revealed that few financial hardship waiver applications have been submitted in all cities interviewed, with waivers being granted only in one-off circumstances. Most cities have instead been successful in finding affordable alternative solutions for businesses that are easily adoptable. Additionally, all cities allow exemptions for businesses with no existing compliant alternative. Only one city official mentioned they have been unable to find an alternative for a very specific product unique to a certain business. Most notably, no negative effects for businesses were reported by any city official post-implementation of their policy.

appendix a

California Cities and Counties With Plastics Restriction Policies (as of January 15, 2020)



appendix b

GOV = Applies only to government facilities

REST = Applies to food service establishments

FULL = Applies to food service establishments and restricts the retail sale of food service ware

Cities in Los Angeles County With Plastics Restriction Policies:

City	Policy	Policy Description	Year Adopted	Type
Calabasas	EPS Ban	Expanded polystyrene ban on all food packaging, requirement that all takeout food packaging must be returnable, recyclable, biodegradable, or degradable.	2008	REST
Culver City	PS Ban	Ban on distribution and sale of polystyrene food service ware, requires food providers to provide takeout disposable utensils to customers upon request only. Ban on polystyrene coolers (not encapsulated).	2017	FULL
Hermosa Beach	PS Ban	Iinitial ban inclues polystyrene food service ware. Updated polystyrene ban includes ban on sale and distribution of meat trays, plastic straws, packing materials and Mylar balloons .	Initial 2012, additional ban in 2019 (updated ban effective in 2020)	FULL
Los Angeles City	EPS Ban	Government facility EPS ban.	1988/2008	GOV
Los Angeles County	EPS Ban	Government facility EPS ban.	2010	GOV
Long Beach	EPS Ban	Expanded polystyrene food service ware ban. Also prohibits the sale and distribution of polystyrene ice chests and polystyrene bean bags. Utensils and straws are provided upon request only for take out orders.	2018 (government facilities), 2019 (food establishments)	REST
Manhattan Beach	PS Ban	Initial ban on polystyrene food service ware. Ban In 2014 prohibits polystyrene coolers, straws, lids, and utensils. 2018 ban prohibits polystyrene egg cartons and packing materials. 2019 ban prohibits polystyrene meat and produce trays.	Initial in 2013, additional bans in 2014, 2018, 2019	FULL

City	Policy	Policy Description	Year Adopted	Type
Malibu	EPS Ban	Initial ban in 2005 prohibits sale and distribution of polystyrene food containers and packing materials. Additional ban in 2017 prohibits sale and distribution of other polystyrene products including all food service ware, meat and produce trays, egg cartons, packing materials, coolers, pool/beach toys, buoys, as well as plastic sandbags. Additional ban in 2018 prohibits the sale and distribution of single-use plastic and bioplastic straws, stirrers, and utensils.	Initial ban in 2005, additional bans in 2017 and 2018	FULL
Monrovia	EPS Ban	Prohibits the use or purchase of expanded polystyrene products at government facilities.	2017	GOV
Pasadena	PS Ban	Ban on sale and distribution of all polystyrene food service ware (cups, bowls, plates, takeout containers); does not include straws, lid cups, or utensils. Ban includes polystyrene coolers.	2017	FULL
Redondo Beach	PS Ban	Ban on PS food service ware. *Passed January 7, 2020.	2020	
Santa Monica	EPS Ban	Ban on all polystyrene and other nonrecyclable plastic disposable food service containers; requires all food packaging to be marine degradable.	2007, additional ban in 2019	REST
South Pasadena	EPS Ban	Ban on sale and distribution of all expanded polystyrene food service ware for food providers and retail providers.	2017	FULL
West Hollywood	PS Ban	PS ban for restaurants and food vendors.	1990	REST

* **Sources:**

1. Californians Against Waste, Table View PS Ordinance. https://www.cawrecycles.org/psordinancetable
2. C. Cadwallader, personal communication, January 6, 2020

appendix c

California Cities and Counties With Various Plastics Restriction Policies

Alameda (2008/2017)
Alameda County (2015)
Albany (2008)
Aliso Viejo (2004)
Arcata (2015)
Arroyo Grande (2016)
Atascadero (2019)
Avalon (2017)
Belmont (2012)
Berkeley (1988/2019)
Brisbane (2014)
Burlingame (2011)
Calabasas (2007)
Campbell (2014)
Capitola (2009/2011)
Carmel (2008/2017)
Carpinteria (2008/2017)
Colma (2013)
Concord (2018)
Contra Costa County (2019)
Cotati (1989)
Culver City (2017)
Cupertino (2014)
Daily City (2012)
Dana Point (2012)
Davis (2017)
Del Mar (2019)
Del Ray Oaks (2009)
Dublin (2019)
El Cerrito (2013)
Emeryville (2007)
Encinitas (2016)
Fairfax (1993)
Fort Bragg (2014)
Foster City (2011)
Fremont (1990/2010)
Gonzales (2014)
Greenfield (2014)
Grover Beach (2018)
Half Moon Bay (2011)
Hayward (2010)
Hercules (2008)
Hermosa Beach (2012/2019)
Highland (1988)
Huntington Beach (2004)
Imperial Beach (2018/2019)
Lafayette (2014)
Laguna Beach (2007)
Laguna Hills (2008)
Laguna Woods (2012)
Livermore (2010/2018)
Long Beach (2018)
Los Altos (2014)
Los Altos Hills (2012)
Los Angeles City (1988/2008)
Los Angeles County (2008)
Los Gatos (2014)
Malibu (2005/16/18)
Manhattan Beach (1988/2019)
Marin County (2009)
Marina (2011)
Martinez (1993)
Mendocino County (2014)
Menlo Park (2012)
Millbrae (2007)
Mill Valley (2009)
Milpitas (2017)
Monrovia (2017)
Monterey City (2009)
Monterey County (2010)
Morgan Hill (2014)
Moro Bay (2016)

Mountain View (2014)
Newport Beach (2008)
Novato (2013/2014)
Oakland (2006)
Ojai (2014)
Orange County (2006)
Pacific Grove (2008)
Pacifica (2009)
Palo Alto (2009/16/19)
Pasadena (2016)
Paso Robles (2019)
Petaluma (2019)
Pinole (2018)
Pismo Beach (2015)
Pittsburg (1991)
Pleasanton (2013)
Point Arena (2010)
Portola Valley (2012)
Rancho Cucamonga (1988)
Redondo Beach (2020)*
Redwood City (2011)
Rialto (1988)
Richmond (2009/13)
Salinas (2011)
San Anselmo (2018/2019)
San Bruno (2009)
San Carlos (2012)
San Clemente (2011)
San Diego (2019)
San Francisco City/County (2006/19)
San Jose (2013)
San Juan Capistrano (2004)
San Leandro (2011)
San Luis Obispo City (2015)
San Luis Obispo County (2019)
San Mateo City (2013)
San Mateo County (2008/11)
San Pablo (2014)
San Rafael (2012)
Santa Barbara (2018)
Santa Clara City (2014)
Santa Clara County (2012)
Santa Cruz City (2008/12/17)
Santa Cruz County (2012/2019)
Santa Monica (2007/2018)
Sausalito (2007)
Scotts Valley (2008)
Seaside (2010)
Sebastopol (2019)
Solana Beach (2015)
Sonoma City (1989)
Sonoma County (1989)
South Lake Tahoe (2018)
South Pasadena (2016)
South San Francisco (2008)
Sunnyvale (2013)
Ukiah (2014)
Union City (2016)
Ventura County (2004)
Walnut Creek (2014)
Watsonville (2009/14/19)
West Hollywood (1990)
Highland (1988)
Yountville (1989)

**Passed on January 7, 2020

** Source: C. Cadwallader, personal communication, January 6, 2020

UCLA Luskin
Center for Innovation

REVISITING PLASTIC WASTE IN L.A. COUNTY, OCT 2021

TRENDS IN PLASTIC WASTE, ALTERNATIVES, AND REGULATION AND IMPACTS OF THE COVID-19 PANDEMIC

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EXECUTIVE SUMMARY

In this update to the UCLA Luskin Center for Innovation's January 2020 report *Plastic Waste in L.A. County*, we revisit the issue of plastics to identify the impacts of the COVID-19 pandemic and other ongoing trends on the plastic waste landscape. In doing so, we hope to provide Los Angeles County with the most complete and up-to-date picture of how plastics continue to impact people and the environment on both the global and regional levels.

Although the world today is profoundly different in many ways compared to January 2020, nothing has altered the fundamental relationship between plastic and the negative environmental, economic, energy, and human health impacts it produces. If anything, the unprecedented rise in plastic waste generation from medical waste and disposable personal protective equipment (PPE) and a shift in consumer and business behavior resulting in greater use of plastic packaging has worsened these impacts, and plastic food service ware and some other single-use packaging continues to be essentially non-recyclable. Perhaps unsurprisingly, representatives of the plastics and fossil fuel industry have attempted to capitalize on public health concerns by casting single-use plastic as a tool to minimize COVID-19 transmission, despite no supporting evidence and much to the contrary. These efforts have been accompanied by an unfortunate number of decisions by policymakers to delay, suspend, or roll back measures to reduce plastic waste.

Workforce disruptions and market volatility have negatively impacted recycling operators who are still coping with the repercussions of China's 2018 National Sword policy. Though prices for recycled plastic are currently on an upward trend, the industry still faces insecurity and many challenges. More operators are upgrading to optical sorting technology—which enables economical recovery of polypropylene, in addition to boosting efficiency and minimizing contamination—but some facilities still face barriers to doing so in the form of cost and space constraints. PET (Code 1) bottles and HDPE (Code 2) continue to be the only reliably recyclable resins, and contaminated plastic food service ware is still *de facto* non-recyclable.

On the composting front, access to capacity is still relatively low for many cities, and stringent siting and permitting rules make creation of new capacity a slow process. Moreover, as in January 2020, compostable materials generally and especially bioplastics are still unattractive to commercial composters due to long breakdown times and difficulty distinguishing compostable products from non-compostable ones. However, progress has been made in removing harmful chemicals from compostable items and promoting field testing to verify breakdown timelines in real-world conditions.

For the first time we explored the available science on aluminum as an alternative to single-use plastic. The high recyclability of aluminum makes it attractive from a solid waste management perspective. However, aluminum production has a very high energy footprint compared to plastic, making its

preferability contingent on minimizing new material required under a best-case scenario. More research comparing the two materials life cycle impacts is called for.

Lastly, although the pandemic produced some paralysis and backsliding, regulatory action on plastics continues apace. In California this activity has occurred primarily at the municipal level, with new jurisdictions instituting "tried-and-true" measures to require reusable items in some contexts and reduce or eliminate usage of small plastic items and polystyrene products. There have also been additional instances of municipalities adopting "fee-for-disposable" models. The most ambitious recent action has occurred in other states—notably Oregon and Maine—in the form of extended producer responsibility models that shift recycling costs to product manufacturers and incentivize measures to boost recyclability.

INTRODUCTION

In January 2020, the UCLA Luskin Center for Innovation (LCI) produced our *Plastic Waste in L.A. County* report for the Los Angeles County Chief Sustainability Office (CSO). That document, intended to provide a knowledge foundation for action taken by the County to address issues related to single-use plastic and plastic waste, examined several facets of the plastics problem. We provided an overview of the materials science behind plastics; discussed the different types of environmental impacts created by their production, use, and disposal; detailed the challenges associated with recycling and disposal of plastics; and identified considerations for lower-impact alternative materials.

However, less than three months following the publication of our report, the COVID-19 pandemic swept the globe. Government resources—including those of L.A. County—were prioritized for public health measures, and numerous businesses experienced unprecedented economic disruption. As a result, the County's regulatory efforts on plastics were temporarily paused.

Now, nearly two years later, these efforts are once again underway. To ensure that policy strategy is informed by the most current and accurate information, the CSO has requested we produce this addendum to our January 2020 report. Herein we review and revisit the key findings of that report, finding that the major conclusions we reached at the time remain valid today. We discuss how COVID-19 has impacted trends in plastic waste and the waste industry generally, as well as how market conditions and other factors continue to evolve independent of the global public health crisis. This includes a discussion of developments and some supplementary information related to alternative materials for single-use items. Finally, we discuss the landscape for regulatory action to curb plastic waste, identifying a number of new developments that have occurred since January 2020.

This update draws from interviews or correspondence conducted with four waste industry professionals in firms serving the Los Angeles area, as well as one expert intimately familiar with policy action on plastics. We also reviewed dozens of academic studies, journalistic works, and other sources covering topics including the quantifiable impacts of COVID-19 on the waste stream, health and sterility concerns related to plastic and alternative materials, ongoing regulatory efforts, and life cycle impacts of alternatives.

REVISITING KEY FINDINGS FROM *PLASTIC WASTE IN L.A. COUNTY*

Our January 2020 report laid our several key findings related to the key areas of analysis we focused on therein. These areas included impacts of plastic, recyclability of plastics (especially food service ware), and alternative materials. In this section we revisit these findings, discussing additional considerations that have arisen since original publication and incorporating new information, where available. Generally, we find that the key takeaways of the original report remain valid, meaning this document should be viewed more as an informational update to our original report, rather than a revision. Though waste management and plastic alternative industries continue to evolve, the central conclusions reached nearly two years ago remain the same.

- Plastic continues to contribute to a variety of adverse environmental, economic, energy-related, and human health-related impacts. These have been increased by a worrisome uptick in medical waste and disposable personal protective equipment (PPE), as well as pandemic-related changes in consumer and retailer behavior that have led to greater use of plastic packaging.
- Factors like material properties, product size, contamination, and market conditions continue to make many single-use plastics items *de facto* non-recyclable.
- PET (Code 1) bottles and HDPE (Code 2) plastics continue to be the only reliably recyclable plastics in the Los Angeles area. However, recent market volatility has created challenges for operators, with recycled PET plastic prices dropping to almost zero at one point in the past year and a half, though they have since rebounded. Facilities continue to upgrade to optical sorting technology, enabling economical recovery of polypropylene (Code 5), but cost and space constraints present challenges for some operators.
- Single-use plastic food service ware is still highly problematic, though some regulatory actions taken at the municipal level constitute progress in reducing plastic waste generated by this sector. The fundamental challenges of these items—including small size and light weight and contamination with grease and other food residues—still make these items economically and practically infeasible to recycle. Although some progress has been made addressing plastic-related concerns at the State level through the enactment of several smaller bills, the legislature has yet to pass transformative, comprehensive legislation.
- Reusable food service ware continues to be the best option for reducing the negative impacts of plastic waste generated by the food service sector. Pandemic-related policies by both governments and businesses that have reduced reusable item usage are misguided or based on misinformation.
- Although some progress has been made in making compostable materials a more attractive alternative to single-use plastics (e.g. the banning of PFAS chemicals in the Biodegradable Products Institute standards) and instituting field testing for compostable products (i.e. via the Compostable Manufacturers Alliance certification standard) most of the major barriers to ideal disposal outcomes for such items persist. Longer-than-ideal breakdown times and ease of distinguishing compostable products from non-compostable ones continue to be major sources of concern for composting operators. However, as we noted in January 2020, there is evidence that the advantages compostables offer in recovery of food waste more than outweigh potential negatives.
- Aluminum may be another potential alternative to plastic in a food service context, given its high recyclability, but high energy costs associated with its processing warrant careful consideration of whether its net environmental impacts are lower than plastic counterparts. Further research comparing the two materials is called for.

- Evidence continues to mount that replacing single-use plastics with alternatives does not result in negative economic impacts for businesses or municipalities, with businesses typically saving money post-payback period for upfront investment. The increase in plastic packaging use and resulting litter may have imposed additional waste management costs on some cities during the pandemic.

PLASTIC TRENDS AND ISSUES RELATED TO THE COVID-19 PANDEMIC

The COVID-19 pandemic has drastically affected patterns of consumption across the globe, resulting in noticeable shifts in the composition of the waste stream. These shifts have exacerbated several of the adverse impacts created by the production and consumption of plastic waste we outlined in our January 2020 report, and have also created additional challenges for a waste industry still coping with the fallout of China's 2018 National Sword policy. Since March 2020, consumer response to the pandemic has also created second-order impacts on plastics via induced changes to market conditions and pricing of raw materials. Relatedly, public perception has been targeted by a concerted misinformation campaign by the plastics industry attempting to portray single-use plastics as a boon for public health, despite no supporting evidence.

CHANGES IN CONSUMPTION PATTERNS AND MARKET RESPONSES

The most pronounced direct impacts of COVID-19 on consumption related to plastic waste pertain to a few distinct categories: medical waste and personal protective equipment (PPE), food and other goods, and the residential-commercial waste divide.

Medical waste and PPE have, unsurprisingly, seen a massive uptick in waste stream prevalence since the beginning of the pandemic. However, it is hard to overstate the magnitude of this uptick, which has been truly breathtaking. International studies have identified numerous instances in which hospitals' medical waste production increased by hundreds of tons *per day*—a nearly five-fold increase in some cases.[1] This figure does not by any means represent a ceiling; other researchers have found waste generation increases in some areas to be as much as +370%, and an assessment of King Abdullah University Hospital in Jordan found the pandemic created a tenfold increase in medical waste production during its initial months.[2,3] To put in another perspective: data from the UK National Health Service showed that just one group, or trust, of four hospitals used approximately 72,000 PPE items per day in the early months of the pandemic.[4]

A substantial portion of this medical waste is plastic, both in the form of packaging (e.g. disposable plastic films for items like syringes and IV bags) and worker equipment (e.g. plastic gowns, gloves, and face masks).[5] For reasons discussed in our January 2020 report, small and lightweight plastic items are

[1] Siming You, Christian Sonne, Yong Sik Ok (2020). COVID-19's unsustainable waste management. *Science* 368(6498), p. 1483. DOI: https://doi.org/10.1126/science.abc7778.
[2] Klemeš J.J., Fan Y.V., Tan R.R., Jiang P. Minimising the present and future plastic waste, energy and environmental footprints related to COVID-19. *Ren. Sustain. En. Rev.*127. DOI: 10.1016/j.rser.2020.109883.
[3] H.A. Abu-Qdais, M.A. Al-Ghazo, E.M. Al-Ghazo (2020). Statistical analysis and characteristics of hospital medical waste under novel Coronavirus outbreak. *Global J. Environ. Sci. Manage.* 6(SI), 21-30. DOI: 10.22034/GJESM.2019.06.SI.03.
[4] Faisal Islam (2020). Why a billion items of PPE is not enough. *BBC*. Accessed Sept. 20, 2021 at https://www.bbc.com/news/business-52362707.
[5] Tanveer M. Adyel (2020). Accumulation of plastic waste during COVID-19. *Science* 369(6509), p. 1314-1315. DOI: https://doi.org/10.1126/science.abd9925.

inherently difficult and inefficient to recycle, meaning most are not recovered and sent to landfill. In the medical context, this would include items like sterile packaging films and syringe caps. Many other types of items (discussed further below) are made of multiple types of plastics which are difficult to separate, again making recycling unlikely.[6] However, even if plastic medical waste was recyclable, it is subject to requirements for sterilization (e.g. incineration) to avoid exposing waste workers to potentially contaminated or hazardous items. The sheer volume of waste has overwhelmed available disposal infrastructure in many areas, leading to many instances of mismanagement.[7]

PPE has also been adopted broadly by members of the public outside of a healthcare context, adding to the volume of plastic waste generated and creating many opportunities for improper disposal of single-use plastic items. Masks, the most common item in use, are almost certainly being used in the billions, if not tens of billions, each month globally (based on maximum demand estimates).[8] Unfortunately these items are the quintessential non-recyclable single-use plastic good: small, lightweight, and commonly composed of mixed plastic polymers including polypropylene (PP), polyethylene, and polyethylene terephthalate (PET).[9,10]

Consumption of *food and other goods* has also changed in response to the pandemic, and given the uncertainty created by new virus variants and lack of vaccine uptake, it is possible these behaviors will persist for some time. Safety concerns from consumers and public health mandates for vendors have led to a pronounced increase in plastic packaging usage for food purchases. In a grocery context, shoppers have utilized more single-use plastic packaging (e.g. produce bags) and generally shown an increased preference for plastic-packaged fresh foods (e.g. produce), increasing single-use plastic consumption on a per-visit, per-customer, and per-item basis.[11,12] Moreover, closures of fresh meat vendors like delis and grocery store meat and fish counters during the pandemic created a downturn in sales of loose meat and other animal products, for which pre-packaged products were generally substituted.[13] More consumers have also turned to grocery delivery services during the pandemic, food from which is often heavily packaged.[14]

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[6] Joana C. Prata, Ana L.P. Silva, Tony R. Walker, Armando C. Duarte, Teresa Rocha-Santos (2020). COVID-19 Pandemic Repercussions on the Use and Management of Plastics. *Environmental Science & Technology* 54(13), 7760-7765. DOI: 10.1021/acs.est.0c02178.

[7] Siming You, Christian Sonne, Yong Sik Ok (2020). COVID-19's unsustainable waste management. *Science* 368(6498), p. 1483. DOI: https://doi.org/10.1126/science.abc7778.

[8] Joana C. Prata, Ana L.P. Silva, Tony R. Walker, Armando C. Duarte, Teresa Rocha-Santos (2020). COVID-19 Pandemic Repercussions on the Use and Management of Plastics. *Environmental Science & Technology* 54(13), 7760-7765. DOI: 10.1021/acs.est.0c02178.

[9] Ana L.P. Silva, Joana C. Prata, Tony R. Walker, Diana Campos, Armando C. Duarte, Amadeu M.V.M. Soares, Damiá Barcelò, Teresa Rocha-Santos (2020). Rethinking and optimizing plastic waste management under COVID-19 pandemic: Policy solutions based on redesign and reduction of single-use plastics and personal protective equipment. *Science of The Total Environment* 742. DOI: https://doi.org/10.1016/j.scitotenv.2020.140565.

[10] Joana C. Prata, Ana L.P. Silva, Tony R. Walker, Armando C. Duarte, Teresa Rocha-Santos (2020). COVID-19 Pandemic Repercussions on the Use and Management of Plastics. *Environmental Science & Technology* 54(13), 7760-7765. DOI: 10.1021/acs.est.0c02178.

[11] Ana L.P. Silva, Joana C. Prata, Tony R. Walker, Armando C. Duarte, Wei Ouyang, Damià Barcelò, Teresa Rocha-Santos (2021). Increased plastic pollution due to COVID-19 pandemic: Challenges and recommendations. *Chemical Engineering Journal* 405, 126683. DOI: https://doi.org/10.1016/j.cej.2020.126683.

[12] Carina Perkins (2020). Six ways coronavirus is threatening progress on single-use plastic. *The Grocer*. Accessed Sept 21, 2021 at https://www.thegrocer.co.uk/plastic/six-ways-coronavirus-is-threatening-progress-on-single-use-plastic/604507.article.

[13] Ibid.

[14] Manuel A. Zambrano-Monserrate, María A. Ruano, Luis Sanchez-Alcalde (2020). Indirect effects of COVID-19 on the environment. *Science of The Total Environment* 728, 138813. DOI: https://doi.org/10.1016/j.scitotenv.2020.138813.

Outside of a grocery context, public health measures barring in-person dining at food vendor locations have translated to an increase in demand for take-out and delivery food.[15,16,17] Packaging intensity is often high in such cases, with food and beverages being supplied in plastic or plastic-lined containers and accompanied by plastic utensils, straws, and other accessories. Some vendors have also suspended policies that previously permitted customers to supply their own reusable items for takeout beverages, further increasing the generation of single-use plastic waste.[18] There is anecdotal evidence that these responses have led to a noticeable increase in plastic trash and litter in some Southern California areas, forcing municipalities to incur additional costs for waste cleanup.[19]

The increased use of plastic packaging is not confined to food consumption. Demand for hygienic supplies besides PPE (e.g. cleaning solutions, disposable wipes)—goods that are often fully or partially packaged in plastic—has also risen substantially.[20] Additionally, there has been a shift in favor of e-commerce for consumer goods generally, creating even more waste from delivery of packaged items.[21]

The result of these changes in consumption patterns is a marked increase in residential waste volume and an accompanying downturn in commercial waste volume.[22] Two of the four waste industry professionals spoken to for this update confirmed these trends have been observed in the Los Angeles area.[23,24] This can create additional fiscal challenges for waste operators, as commercial contracts generally subsidize less profitable processing of residential waste.[25]

Although none of the four waste industry professionals spoken to could attest to an observable uptick in plastic waste at material recovery facilities (MRFs) operated by their employers, it seems credulous to believe that Los Angeles is immune to the plastic waste-related impacts of COVID-19 demonstrably experienced by myriad countries, regions, and cities across the globe. One professional indicated that a more observable change is the increase in residential food waste, which is more noticeable than a correlated increase in food packaging.[26] Other trends—one professional stated their facility is taking in a significantly greater amount of cardboard compared to pre-pandemic, for instance—may also be masking

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[15] Tanveer M. Adyel (2020). Accumulation of plastic waste during COVID-19. *Science* 369(6509), p. 1314-1315. DOI: https://doi.org/10.1126/science.abd9925.

[16] Carina Perkins (2020). Six ways coronavirus is threatening progress on single-use plastic. *The Grocer*. Accessed Sept 21, 2021 at https://www.thegrocer.co.uk/plastic/six-ways-coronavirus-is-threatening-progress-on-single-use-plastic/604507.article.

[17] Shashank Bengali (2020). The COVID-19 pandemic is unleashing a tidal wave of plastic waste. *Los Angeles Times*. Accessed Sept 21, 2021 at https://www.latimes.com/world-nation/story/2020-06-13/coronavirus-pandemic-plastic-waste-recycling.

[18] Ibid.

[19] Plastics regulatory expert, personal communication, August 6, 2021.

[20] Daiane Scaraboto, Alison M. Joubert, Claudia Gonzalez-Arcos (2020). Using lots of plastic packaging during the coronavirus crisis? You're not alone. *The Conversation*. Accessed Sept 21, 2021 at https://theconversation.com/using-lots-of-plastic-packaging-during-the-coronavirus-crisis-youre-not-alone-135553.

[21] Kumar Raja Vanapalli, Hari Bhakta Sharma, Ved Prakash Ranjan, Biswajit Samal, Jayanta Bhattacharya, Brajesh K. Dubey, Sudha Goel (2021). Challenges and strategies for effective plastic waste management during and post COVID-19 pandemic. *Science of The Total Environment* 750, 141514. DOI: https://doi.org/10.1016/j.scitotenv.2020.141514.

[22] Scott Horsley (2020). 'Hard, Dirty Job': Cities Struggle to Clear Garbage Glut In Stay-At-Home World. *NPR*. Accessed Sept 21, 2021 at https://www.npr.org/2020/09/21/914029452/hard-dirty-job-cities-struggle-to-clear-garbage-glut-in-stay-at-home-world.

[23] Waste industry professional #2, personal communication, September 3, 2021.

[24] Waste industry professional #3, personal communication, September 3, 2021.

[25] Ibid.

[26] Waste industry professional #1, personal communication, August 31, 2021.

fluctuations in plastic waste.[27] Some portion of COVID-related plastic waste may also simply be bypassing recovery facilities and going straight to landfills if residents are discarding packaging items in trash bins, the contents of which may not be sent to a recovery facility.[28] In some cases waste may be being diverted to landfills and incinerators due to public health concerns (i.e. exposing workers to items contaminated with virus particles).[29]

Decreased demand for fossil fuels during the pandemic—attributable in large part to a decline in commuting and travel—has also affected the plastic waste landscape. The resulting drop in oil prices led to increased manufacturing of virgin plastic and a decline in demand for recycled plastic, creating additional fiscal strain on recycling operators.[30,31] The price of recycled PET (Code 1)—the most common plastic resin recycled by volume—dropped to just above $0 in September 2020, according to one waste industry professional.[32] However, prices of recycled plastics, including PET and polypropylene (Code 5) have trended upwards in recent months, and HDPE (Code 2) prices have drastically increased over the last year and a half for reasons that are unclear.[33]

In addition to the challenges created by fluctuating prices for recycled plastic, pandemic-related disruptions—including concerns of workers being exposed to contaminated waste items—have led to throughput reductions or complete shutdowns of recycling operations in many parts of the country.[34]

Misinformation Regarding Plastics and Public Health

Another worrisome phenomenon observed during the pandemic was a wave of misinformation regarding the public health impacts of single-use plastics versus alternatives. In the early stages of COVID-19's global spread, the plastics industry capitalized on public concern regarding virus transmissibility by claiming that single-use plastic items—especially those used in food service and grocery contexts, such as bags and food and beverage containers—were safer than reusable alternatives.[35,36] These claims were made with no supporting scientific evidence or empirical data, but were nevertheless accompanied by a slew of public sector actions to temporarily suspend, delay, or roll back policies meant to curb harmful

[27] Waste industry professional #4, personal communication, September 9, 2021.
[28] Waste industry professional #2, personal communication, September 3, 2021.
[29] Rachel A. Meidl (2020). Pandemic, Plastics and the Continuing Quest for Sustainability. *Forbes*. Accessed Sept 22, 2021 at https://www.forbes.com/sites/thebakersinstitute/2020/04/14/pandemic-plastics-and-the-continuing-quest-for-sustainability/?sh=382b71a077b4.
[30] Ana L.P. Silva, Joana C. Prata, Tony R. Walker, Diana Campos, Armando C. Duarte, Amadeu M.V.M. Soares, Damiá Barcelò, Teresa Rocha-Santos (2020). Rethinking and optimizing plastic waste management under COVID-19 pandemic: Policy solutions based on redesign and reduction of single-use plastics and personal protective equipment. *Science of The Total Environment* 742. DOI: https://doi.org/10.1016/j.scitotenv.2020.140565.
[31] DeAnne Toto (2020). Challenges of the unknown. *Waste Today*. Accessed Sept 22, 201 at https://www.wastetodaymagazine.com/article/covid-19-recycling-industry-survey-responses/.
[32] Waste industry professional #2, personal communication, September 3, 2021.
[33] Ibid.
[34] Colin Staub (2020). Coronavirus pandemic disrupts recycling sector. *Resource Recycling*. Accessed Sept 22, 2021 at https://resource-recycling.com/recycling/2020/03/17/coronavirus-pandemic-disrupts-recycling-sector/.
[35] Caroline Griffith (2020). Contrary to What the Plastics Industry Says, Single-Use Isn't Safer. *The Northcoast Environmental Center*. Accessed Sept 22, 2021 at https://www.yournec.org/contrary-to-what-the-plastics-industry-says-single-use-isnt-safer/.
[36] Jasmin Malik Chua (2020). Plastic bags were finally being banned. Then came the pandemic. *Vox.* Accessed Sept 22, 2021 at https://www.vox.com/the-goods/2020/5/20/21254630/plastic-bags-single-use-cups-coronavirus-covid-19-delivery-recycling.

consumption of extraneous single-use plastics.[37,38,39] In addition to the short-term harms created by these regressive policy actions through permitting more consumption of single-use plastic and the generation of a commensurate amount of plastic waste, such actions threaten to erode hard-won progress shaping consumer habits.[40]

Since the claims of single-use plastics' public health advantages were made, new research has shown that the reality is likely the opposite. To begin with, the likelihood of surface transmission of COVID-19 is extremely low.[41] Even if an appreciable risk of surface transmission existed, multiple studies have confirmed that COVID-19 virus particles persist and remain viable on plastic much longer than alternative materials like paper and cotton.[42,43] Therefore, while one could justify actions taken by policymakers and businesses early in the pandemic to not use reusable items out of an abundance of caution when information on surface transmission was not available, there is no scientific justification for these policies to persist, nor to delay further action to reduce single-use plastic usage.

Overall Impacts of COVID-19 on the Plastic Waste Landscape

Given the trends and issues discussed above, impacts from the COVID-19 pandemic are likely manifesting in a number of ways:

- *Increased negative environmental, economic, and energy-related impacts* resulting from an increase in usage of single-use plastics (and therefore, increased manufacturing and usage of fossil fuel feedstocks), particularly for medical items and PPE and packaging for food and consumer goods. For reasons discussed above or in our original report, many of these items are not recyclable for practical and/or public health reasons, meaning they are typically landfilled or incinerated. PPE items are also contributing significantly to plastic litter, creating a new type of pervasive plastic pollution with negative environmental and economic effects.[44,45]
- *Fiscal strain and other disruptions* for the recycling and waste management industry resulting from volatile market conditions, public health concerns, and a significant shift from commercial

[37] Ibid.
[38] Ana L.P. Silva, Joana C. Prata, Tony R. Walker, Diana Campos, Armando C. Duarte, Amadeu M.V.M. Soares, Damiá Barcelò, Teresa Rocha-Santos (2020). Rethinking and optimizing plastic waste management under COVID-19 pandemic: Policy solutions based on redesign and reduction of single-use plastics and personal protective equipment. *Science of The Total Environment* 742. DOI: https://doi.org/10.1016/j.scitotenv.2020.140565.
[39] Daiane Scaraboto, Alison M. Joubert, Claudia Gonzalez-Arcos (2020). Using lots of plastic packaging during the coronavirus crisis? You're not alone. *The Conversation*. Accessed Sept 21, 2021 at https://theconversation.com/using-lots-of-plastic-packaging-during-the-coronavirus-crisis-youre-not-alone-135553.
[40] Ibid.
[41] Dyani Lewis (2021). COVID-19 rarely spreads through surfaces. So why are we still deep cleaning? *Nature* 590, 26-28. DOI: https://doi.org/10.1038/d41586-021-00251-4.
[42] Denis E. Corpet (2021). Why does SARS-CoV-2 survive longer on plastic than on paper? *Medical Hypotheses* 146, 110429. DOI: https://doi.org/10.1016/j.mehy.2020.110429.
[43] Neeltje van Doremalen, Dylan H. Morris, Myndi G. Holbrook (2020). Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1. *The New England Journal of Medicine* 382, 1564-1567. DOI: 10.1056/NEJMc2004973.
[44] Justine Ammendolia, Jacquelyn Saturno, Amy L. Brooks, Shoshanah Jacobs, Jenna R. Jambeck (2021). An emerging source of plastic pollution: Environmental presence of plastic personal protective equipment (PPE) debris related to COVID-19 in a metropolitan city. *Environmental Pollution* 269, 116160. DOI: https://doi.org/10.1016/j.envpol.2020.116160.
[45] Gurusamy Kutralam-Muniasamy, Fermín Pérez-Guevara, V.C. Shruti (2022). A critical synthesis of current peer-reviewed literature on the environmental and human health impacts of COVID-19 PPE litter: New findings and next steps. *Journal of Hazardous Materials* 422, 126945. DOI: https://doi.org/10.1016/j.jhazmat.2021.126945.

waste to relatively less profitable residential waste. However, trends are currently positive in this area, as recycled plastic prices have recently been on an upward trend and commercial waste volume is beginning to rebound.[46]

OTHER TRENDS AND ISSUES RELATED TO PLASTIC WASTE AND ALTERNATIVES

In addition to developments since January 2020 that are attributable to the COVID-19 pandemic, the plastics landscape continues to evolve independent of the ongoing public health crisis. Below, we discuss a few noteworthy developments and trends. Presented in no particular order, these include retooling within the recycling industry, long-term market conditions affecting plastic, and activity and new information regarding alternative materials.

The recycling industry continues to retool in response to conditions precipitated by China's 2018 National Sword policy. The primary driving factor continues to be the new, stringent contamination standards the policy *de facto* instituted for the global recycling market. Achieving these new standards essentially mandates recycling operators to adopt optical sorting technology, which—as we discussed in our January 2020 report—offers significant advantages not only in terms of limiting contamination, but also in throughput volume and efficiency.[47] One waste industry professional interviewed for this update noted that their operator recently installed a new sort line with optical technology, and noted that it is likely other operators are pursuing similar upgrades.[48] A key feature of optical sorting is that it enables economical recovery of polypropylene (Code 5), meaning that as more operators integrate optical technology polypropylene will become more realistically recyclable. However, without a comprehensive overview of facilities serving the Los Angeles area, we cannot definitively say whether polypropylene can yet be characterized as truly recyclable.

Barriers and challenges still exist pertaining to optical sorting, though. As we discussed in our original report, though highly advantageous, optical technology has difficulty capturing many types of single-use plastic products (e.g. thin films, small and lightweight items, greasy or otherwise contaminated items). Additionally, cost and space continue to make widespread adoption by operators difficult. The aforementioned new sort line installed by one operator constituted a $25 million investment, and another waste industry professional interviewed noted that the small physical size of their facility is hamstringing their ability to retool operations.[49,50]

Long-term trends in the plastics market are subject to significant uncertainty, but the short-term disruptions caused by COVID-19 (discussed above) and forecasts from the fossil fuel industry create reasons for concern. As aforementioned, a short-term drop in demand for fossil fuels accompanying the onset of the pandemic produced lower oil prices, resulting in increased production of cheaper virgin plastics. Should national and international efforts to achieve widespread decarbonization make progress in the coming years—perhaps aided by long-term changes to patterns of work and travel spurred by COVID-19—this phenomenon may repeat itself in a more significant and long-lasting fashion. Worrisomely, projections from the fossil fuel industry are making increased production and consumption of plastic a foundational pillar of their future business model. Industry projections count on plastic to be the major driver of new oil demand in the coming decades, to the extent that plastics would account for

[46] Waste industry professional #3, personal communication, September 3, 2021.
[47] Waste industry professional #2, personal communication, September 3, 2021.
[48] Ibid.
[49] Ibid.
[50] Waste industry professional #4, personal communication, September 9, 2021.

20% of global oil consumption (and 15% of the global carbon allowance under a 2ºC scenario) by 2050.[51,52] Such a scenario would be disastrous for global efforts to combat climate change, and underscores the importance of regulatory action to both reduce plastic consumption and new exploitation of fossil fuel resources.

Promising developments regarding alternatives to plastic have occurred since *Plastic Waste in L.A. County* was completed, but many challenges remain related to end-of-life disposal for non-plastic single-use materials. The most notable point of progress is that the certifying body for compostable products in the United States, the Biodegradable Products Institute (BPI), implemented new standards in January 2020 addressing the issue of fluorinated chemicals (i.e. PFAS).[53] As we noted in our original report, presence of PFAS chemicals in ostensibly compostable fiber-based items was one of several notable concerns for composting operators, given the numerous health hazards associated with them. However, the most important barrier to commercial composting—the fact that compostable materials simply take too long to break down—persists.[54] Progress is being made in this area via an increased emphasis on field testing (i.e. through the Compostable Manufacturing Alliance certification standard), which is crucial to ensuring products break down as expected even when real-world conditions like oxygenation and moisture levels vary. However, these standards continue benchmark using ASTM D64000/D6868 guidelines, which stipulate biodegradation occurring within 180 days—significantly longer than the typical commercial composter turnover period. Ideal disposal outcomes for compostables also continue to be hindered by a lack of clear and consistent labeling schemes and low nutrient content, along with difficulties associated with siting and permitting for composting facilities generally.[55]

For jurisdictions deciding what compostable alternatives to permit for use by food vendors in place of single-use plastics, the ideal items would have the following traits:

- Primarily composed of *fiber-based materials* with no or minimal bioplastic coatings.
- Devoid of toxic fluorinated chemicals (i.e. PFAS).
- Design that maximizes surface area-to-volume ratio while minimizing product mass.
- Field-tested and certified to biodegrade in <90 days (which may be infeasible); OR certified compostable in home or community composter settings.
- Consistently labeled and clearly distinguishable from non-compostable analogues by both consumers and composting operators.
- Uses material inputs that do not create additional environmental or climatological impacts (e.g. agricultural post-processing waste).
- Accompanied by waste receptacles and systems that maximize co-capture of compostable packaging and food waste.

A topic left unaddressed in our first report is the attractiveness of aluminum as an alternative material to plastic in a food service context. Aluminum offers significant advantages over plastic with regards to recyclability. The current national recycling rate for aluminum beverage cans—the most ubiquitous single-use aluminum product—is much higher than plastic (approximately 50%), with about 82% of

[51] David Roberts (2020). Big Oil's hopes are pinned on plastics. It won't end well. *Vox*. Accessed Sept 23, 2021 at https://www.vox.com/energy-and-environment/21419505/oil-gas-price-plastics-peak-climate-change.
[52] World Economic Forum (2016). The New Plastics Economy: Rethinking the future of plastics. Accessible at http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf.
[53] Biodegradable Products Institute (2020). Fluorinated Chemicals. Accessed Sept 24, 2021 at https://bpiworld.org/Fluorinated-Chemicals.
[54] Waste industry professional #3, personal communication, September 3, 2021.
[55] Ibid.

aluminum being recovered from a can that is properly disposed of.[56] Similar advantages can be observed with respect to recycled content, as domestically produced aluminum cans are composed of 73% recycled material on average.[57]

Unfortunately, other aspects of aluminum limit its overall attractiveness as an alternative to plastic in single-use contexts. Several studies have used life cycle assessment (LCA) to examine the overall environmental impact of two comparable items: plastic PET beverage bottles and aluminum beverage cans. The four studies reviewed for this update conclude that PET bottles have a lower overall environmental impact on both a one-to-one and per-volume basis.[58,59,60,61] The primary driving factors behind aluminum's poor performance in these studies are its very high associated energy inputs and, to a smaller degree, its greater water use. Single-use aluminum items are also heavier and bulkier than their plastic counterparts, intensifying transportation fuel costs and upping their global warming potential in comparison to plastic.[62,63] However, aluminum's huge advantages in in recyclability potential essentially put it at parity with PET plastic when sufficiently high recycled content (~80%) is achieved, though there is no consensus on which material edges out the other in such a scenario. This suggests that, if implemented with high minimum recycled content standards for single-use food service ware (>80%) and very high recovery rates, aluminum could be a lower-impact alternative to plastic in such use cases.

One key piece of highly relevant information needed to properly compare aluminum and plastics is missing. As with many of the LCA studies we reviewed for our original report that compared single-use plastics and compostable materials, the studies assessed for this update do not address the impact of solid waste pollution and resulting ecological harms. Given that this is one of the most important and salient negative impacts of plastic waste, as well as the existence of additional uncertainties (e.g. whether the aluminum supply chain could provide enough material to substitute for even a fraction of single-use plastics[64]), we cannot definitively recommend for or against policy action to encourage adoption of single-use aluminum items in place of plastic ones. Further study is urgently needed in this area, ideally in the form of an LCA that examines multiple types of plastic, compostable, and aluminum items and incorporates impact categories for ecological and wildlife impacts.

RECENT AND ONGOING REGULATORY ACTION

[56] James Souder, Benjamin Elizalde, Jochem van der Zaeg, Eva Gladek (2020). Recycling Unpacked: Assessing the Circular Potential of Beverage Containers in the United States. *Metabolic*. Accessible at https://www.metabolic.nl/publications/recycling-unpacked/.
[57] Ibid.
[58] Yahya Saleh (2016). Comparative life cycle assessment of beverages packages in Palestine. *Journal of Cleaner Production* 131, 28-42. DOI: https://doi.org/10.1016/j.jclepro.2016.05.080.
[59] C.M.V.B. Almeida, A.J.M. Rodrigues, S.H. Bonilla, B.F. Gianetti (2010). Energy as a tool for Ecodesign: evaluating materials selection for beverage packages in Brazil. *Journal of Cleaner Production* 18, 32-43. DOI: 10.1016/j.jclepro.2009.03.019.
[60] David Amienyo, Haruna Gujba, Heinz Stichnothe, Adisa Azapagic (2013). Life cycle environmental impacts of carbonated soft drinks. *The International Journal of Life Cycle Assessment* 18, 77-92. DOI: 10.1007/s11367-012-0459-y.
[61] Sphera (2020). Beverage Packaging: A Comparative Life Cycle Assessment. *Ball Corporation*. Summary accessible at https://www.ball.com/Ball/media/Ball/Global/Sustainability/LCA-presentation-US.pdf.
[62] Ibid.
[63] Jesse Klein (2021). Should you swap plastic for aluminum packaging? It's complicated. *GreenBiz*. Accessed Sept 24, 2021 at https://www.greenbiz.com/article/should-you-swap-plastic-aluminum-packaging-its-complicated.
[64] Ibid.

Putting aside the aforementioned delays and suspensions of single-use plastics regulations resulting from the COVID-19 pandemic, progress on addressing the plastic waste issue has continued since January 2020. The State legislature has enacted several smaller, focused pieces of legislation addressing topics like accurate labeling of recyclables and compostables and how exports of mixed plastic are reported, but has yet to enact comprehensive legislation such as the California Circular Economy Act. Thus, the lion's share of impactful regulatory progress in California continues to be at the municipal level. A number of cities, including Culver City, Palm Springs, Beverly Hills, Pasadena, Burbank, and the County and City of Los Angeles have taken or are considering action to curb plastic waste in some form.[65] These actions can generally be characterized as focusing on tried-and-true approaches, such as instituting "upon-request" measures for food service accessories, bans on expanded polystyrene products, and restrictions on single-use plastic items at public facilities and events.[66] Somewhat more ambitiously, some municipalities—Culver City being one notable example—have passed ordinances that will require reusable items to be used for dine-in food service and ban many non-recyclable single-use plastic items (e.g. straws and utensils).[67,68] The "fee-for-disposable" model has also expanded in usage; a number of jurisdictions in Sonoma County, for instance, have adopted an ordinance allowing (though not requiring) vendors to charge $0.25 for disposable item usage.[69] Such measures continue to be viewed cautiously due to potential regressive impacts on low-income consumers.[70]

Relatedly, efforts by non-governmental organizations are helping reduce barriers to reusable adoption for food vendors. Although mostly limited to Northern California at this time, a nascent business model is emerging focused providing reusable food service ware and hub dishwashing services to vendors that face capital and/or space constraints.[71] Such services could be crucial to expanding reusable usage to non-dine-in settings and small, independent vendors like food trucks. Additionally, non-profit groups like Plastic Free Restaurants and ReThink Disposable continue to be active in helping vendors transition to a reusable model through consultative support and grants to assist with capital costs.[72,73] These efforts also provide an expanding database showcasing the fiscal benefits of reusable adoption for vendors.[74]

Some of the most promising activity is occurring outside of California as other State legislatures take bold steps to address the plastic waste and recycling crises. In particular, both Oregon and Maine recently enacted a form of extended producer responsibility model in which plastics manufacturers pay for the cost of recycling their products.[75,76] These measures bring to the United States a model that has been highly successful internationally in fostering a healthy recycling system; Oregon will require producers to pay

[65] Plastics regulatory expert, personal communication, August 6, 2021.
[66] Ibid.
[67] Ibid.
[68] City of Culver City (2021). City Ban On Single-Use Plastics. Accessed Sept 27, 2021 at https://www.culvercity.org/City-Hall/Reports-policies-local-laws/City-Ban-On-Single-Use-Plastics#section-1.
[69] Zero Waste Sonoma (n.d.). Disposable Food Service Ware and Polystyrene Foam Ban Model Ordinance. Accessed Sept 27, 2021 at https://zerowastesonoma.gov/reduce/commercial/model-ordinance.
[70] Plastics regulatory expert, personal communication, August 6, 2021.
[71] Ibid.
[72] Ibid.
[73] ReThink Disposable (2020). Businesses. *Clean Water Action and Clean Water Fund*. Accessed Sept 27, 2021 at https://www.rethinkdisposable.org/businesses.
[74] Ibid.
[75] Monica Samayoa (2021). Oregon's recycling system is getting an update. Packaging makers will help pay for it. *OPB*. Accessed Sept 27, 2021 at https://www.opb.org/article/2021/08/13/oregons-recycling-system-is-getting-an-update-packaging-makers-will-help-pay-for-it/.
[76] Winston Choi-Schagrin (2021). Maine Will Make Companies Pay for Recycling. Here's How It Works. *The New York Times*. Accessed Sept 27, 2021 at https://www.nytimes.com/2021/07/21/climate/maine-recycling-law-EPR.html.

for approximately 28% of recycling costs incurred by local governments, while Maine's measure makes manufacturers responsible for funding 100% of such costs—a commendable approach.[77] Such models are expected to stabilize struggling recycling operators and municipal programs and create fiscal incentives for manufacturers to make products that are easier to recycle.[78]

[77] Ibid.
[78] Ibid.

	Organization/Affiliation	Comment	Response
1	Acton Town Council	Is it possible to get a copy of the actual ordinance language for review?	The ordinance is under review by County Counsel and not yet available for review. A detailed summary of the ordinance was provided for stakeholder review and comment.
2		Please clarify why street food vendors are exempted from this ordinance.	The County is currently in the process of reviewing and revising the approach to regulating street food vending operations, as directed by a Board motion that was adopted in November 2021. The Department of Public Health is developing a report back with recommendations on revising permitting from these businesses, so requirements on single use articles may be considered through that process.
3	American Chemistry Council	Not supportive of proposal in current form	Comment acknowledged.
4		Ordinance imposes mandate without any consideration of functionality or cost	The County understands that some businesses may have specific challenges related to costs or performance of alternative materials, so the ordinance allows for waivers in these circumstances on a case by case basis, as well as a more general waiver that may be granted by the Director of Public Works if a particular product type is identified as having no suitable alternative.
5		Ordinance assumes that some containers are easily "recyclable" and that "compostable" containers are readily available in terms of cost and performance	See response to comment #4.
6		Ordinance does not address issue of whether infrastructure is sufficient to accept and process alternative materials	Jurisdictions throughout the State are in the process of aligning and developing organics collection and processing systems to comply with the requirements set out in SB1383. While implementation of those requirements as well as of the ordinance is ongoing, the ordinance is well-timed to produce synergy with efforts related to SB1383.
7		Plastic containers are efficient in terms of minimizing air emissions, energy used, and reducing waterborne waste from manufacturing process.	Comment acknowledged.
8		Proposal abandons idea of plastic recycling when there are opportunities to grow and encourage local recycling markets and economic development	The ordinance solely applies to plastic food service ware which the UCLA study found is not recycled due to contamination and other issues. The County has programs in place to encourage local recycling markets, and supports plastics recycling.
9		Need uniform, statewide recycling and waste reduction policy that modernizes existing infrastructure, provides appropriate funding, ensures end-use markets and provides businesses with regulatory certainty. County should wait until either SB54 becomes law or initiative measure is voted on, and that County participate in statewide effort before considering any new local ordinances.	The County agrees that additional funding for recycling infrastructure is needed and supports statewide efforts to create such funding and infrastructure.
10		Instead of creating ban, consider framing issue in terms of transitioning to more circular economy.	Switching to compostable and fiber based options will help support a circular economy by ensuring that food service ware can be turned into compost and soil amendments that are valuable products for food producers.
11		Support "Five Actions for Sustainable Change" - increase recycling access, collection, and education for all materials.	Comment acknowledged.
12		Encourage County to work closely with industry to increase plastic recycling rate, e.g. Houston Recycling Collaboration.	Comment acknowledged, and the County welcomes partnership with industry.

	Organization/Affiliation	Comment	Response
13	Athens Services	Attached outreach and education materials created for Athens, and link to "What Goes Where Guide"	Comment acknowledged.
14		UCLA report is not accurate - Athens and other haulers are able to sort 1,2, and 5 plastic food service ware and sell to market.	Comment acknowledged, and will be communicated to the report authors.
15		The acceptance of Compostable products should be based on the local infrastructure and market (just as they do for recycling in the plastic pollution act). Bioplastics may be certified but are not acceptable at facilities and will cause contamination to organics stream.	Definition is being revised based on stakeholder feedback.
16		There are acceptable compostable items that are not certified compostable such as napkins, wood utensils and stirrers, wood plates, etc.	See response to comment #15.
17		Complaint based enforcement is not adequate, there needs to be a more robust process to identify when businesses are not in compliance.	This approach is based on the County's previous experience with the plastic bag ban. The County has the option to implement a more robust compliance program if the complaint based approach is determined to be inadequate.
18	California Restaurant Association - LA Chapter	Express strong opposition for proposed provisions which look to ban use of polystyrene food packaging, single use plastic food service products, and mandate reusable food ware to all food service facilities.	Comment acknowledged. Note that the ordinance's mandate for reusable food ware is limited solely to full service restaurants.
19		Share concerns about litter and want to encourage recycling and reduce food waste, and support packaging mandates that require food packaging materials to be recyclable or compostable.	Comment acknowledged.
20		EPS and plastic food containers are among the most efficient for keeping food fresh, and providing insulation at economical price and should not be banned.	Comment acknowledged.
21		Banning EPS and plastic food ware will not only limit options for business to choose appropriate material for their needs, but will prove challenging because of supply chain issues resulting from pandemic.	See response to comment #4.
22		The cost of foods, including food service ware has increased while supply has decreased, and alternative packaging can often be as high as 2-3 times more expensive.	See response to comment #4.
23		Switching to alternative materials that are less structurally effective will compromise the quality of the food, and can become a potential safety hazard.	See response to comment #4.
24		Strongly oppose any potential ban on disposable food ware for dine-in customers. As restaurants recover from the pandemic, now is not the time for dramatic shifts in service models.	The County understands that some businesses may face challenges with costs as well as space and other constraints related to the requirement of reusables for dine-in customers, so the ordinance includes a waiver process to accommodate these situations.
25		Ban of disposables for dine-in would result in unintended, negative environmental consequences because of increases in water and energy use.	Comment acknowledged. Life cycle analyses cited by UCLA note that reusables are beneficial as compared to disposables across most environmental impact categories.

	Organization/Affiliation	Comment	Response
26	California Restaurant Association - LA Chapter (cont'd)	Restaurants often lease their space so cannot change their physical footprint. Small restaurants who don't have dishwashers and can't add machines will be forced to hire additional labor to wash dishes, and will have to deal with storage of reusables.	See response to comment #24.
27		Restaurants need help from local government to survive and CRA urges County to consider measures to help restaurants recover.	Comment acknowledged.
28	Californians Against Waste	Express strong support for the proposed ordinance. The ordinance establishes proper measures to reduce the use of single use plastics and is a major step towards combatting ongoing issues with plastic waste.	Comment acknowledged.
29		Consider expanding reuse for dine-in requirement to all food facilities	While the County notes that reusables have been found to have lower environmental impacts in general as compared to disposable options, the County recognizes that some businesses would face greater challenges than others in shifting their operations to reusables based on their current business model. The County wants to ensure that we have adequate resources and capacity to support the full range of transitions that will be required by the draft ordinance.
30		Establish a funding mechanism for ordinance implementation using fees collected through enforcement. Departments will need to build capacity.	Comment acknowledged. If the ordinance is adopted by the Board of Supervisors, the County will develop an implementation plan that includes education and outreach, and that seeks to identify financial resources to support businesses.
31		Specify that recyclable items must be able to be recycled in local facilities, and that facilities may not include transformation (incineration, pyrolysis, distillation), or any form of chemical recycling.	Definition of recycling excludes incineration. Since single-use plastics are not considered recyclable according to draft ordinance, further limiting the definintion to specific technologies is not necessary.
32		Include a requirement that all food facilities accept a customer-provided reusable or refillable foodware item (unless dirty, unsanitary, etc.).	While not included in the proposed ordinance at this time, this recommendation can be considered in future revisions or updates of the ordinance as directed by the Board.
33	Coalition letter: American Chemistry Council CA Chamber of Commerce CA Manufacturers and Technology Association CA Retailers Association Dart Container LA Chamber of Commerce LA County Business Federation Valley Industry and Commerce Association	Proposal will add costs to small businesses when County is still working on composting infrastructure and the ordinance will not be beneficial until there are adequate composting facilities and collection available.	See response to comment #6.
34		Ordinance will unfairly harm most vulnerable small businesses and add new costs to food and goods while inflation is rising.	See response to comment #4.
35		Proposal eliminates choice, only options allowed are costly. Real cost increase of switching will be significant - compostable forks are three to four times more expensive than traditional plastic forks.	See response to comment #4.
36		UCLA study indicates that businesses can pass costs onto customers, however does not take into account how new costs would further impact rising inflation, increasing cost of food, supply chain challenges, and labor costs increases.	See response to comment #4.
37		Many businesses are small and don't have space or employees to meet what is required, such as adding dishwashing. Other restaurants do a majority of to-go orders, and ordinance will impact cost and quality.	See response to comment #24.

	Organization/Affiliation	Comment	Response
38	Coalition letter (cont'd)	Without adequate composting facilities, how will compostable materials be managed? And if landfilled, is it worth the increase in costs and additional struggles for small businesses if it does not advance the County's sustainability goals	See response to comment #6.
39		It is also unknown whethere there is ample supply to meet the requirements of ordinance. Maui banned disposable plastic food ware but delayed it because of supply chain issues and lack of available alternatives.	See response to comment #4.
40		Proposal significantly reduces or eliminates recycling of plastic even though there are many types of plastic products that can and are being recycled in the County.	See response to comment #8.
41		Has the County conducted an analysis as to the types of food service materials that are accepted by local haulers in curbside programs, are being processed and marketed to viable end users that are creating new food service packaging? Recommend that there is confirmation that there is collection/processing infrastructure in place to manage materials.	See response to comment #6.
42		Oregon Department of Environmental Quality found that compostable food service ware can have larger environmental impacts than non-compostable items because of increased energy used which increases greenhouse gas emissions.	See response to comment #15. The goal of the cited study was to evaluate the use of labels such as "recyclable" and "compostable" to determine the most environmentally beneficial products. As such, the cited study does not distinguish between types of food service ware labeled as compostable (e.g. whether the product is certified, whether it is composed of bioplastic or fiber-based, whether it may contain fluorinated compounds, etc.), resulting in the highly variable impacts they report. In addition, the study acknowledges that key potential benefits of compostable materials could not be included in their assessment such as increasing diversion of food waste and sequestering of carbon through increased compost usage.
43		Many compostable products are not fully compostable and degrade value of compost.	See response to comment #15.
44		Urge County to pause this proposal and address factors that will increase burden on small businesses especially when there is not adequate infrastructure to manage proposed mandates.	Comment acknowledged.
45		Propose working together to address infrastructure challenges, and develop policy such as requirement of post-consumer recyclable materials for single use plastic food ware as an alternative which will create a market and new green jobs.	Comment acknowledged. The County welcomes partnership in addressing these issues.

	Organization/Affiliation	Comment	Response
46	Courtney Torres Consulting	The UCLA Luskin report is 2 years old now, can we see the update?	Addendum was sent to commenter.
47		What is compost infrastructure in LA County right now?	Please see the Los Angeles County Countywide Organic Waste Management Plan 2020 Annual Report for the County's most recent assessment of compost infrastructure.
48		What is the cost difference between compostables and current plastic options?	The range of potential cost differences is discussed in the UCLA report. This is highly dependent on the particular item and particular materials of both the compostable item as well as the item it would be replacing.
49		Can we get a list of product suppliers and their capacity?	See response to comment #30.
50		Can you provide examples of local jurisdictions referenced in UCLA report?	Appendices B and C of the UCLA report contain examples of local jurisdictions that have adopted policies limiting the use of single use plastics.
51		We are still in a pandemic situation, what has changed per the UCLA report?	Per the UCLA report, the pandemic has caused an increase in plastic waste both through increased PPE and medical waste, and likely as a result of increased home deliveries.
52		Re: compostable certifications, how will this be determined?	The ordinance includes definitions of what is considered compostable, including third party certifications that product manufacturers can obtain.
53		How do we ensure food ware is being composted?	See response to comments #15 and #30.
54		Re: reusables in full-service restaurants, are there public health concerns or has this been addressed?	There are well-established public health guidelines for restaurants to use their own reusable service ware, and those would be followed here.
55		Re: written records requirement, do we have models or examples of how this works in other places?	This is a standard requirement in many County ordinances, however ordinance is being revised to allow for digital records.
56	East Yards Communities for Environmental Justice	Consider including definitions of "single-use" and "microplastics" so that there is a shared understanding.	The ordinance will contain a definition of single-use, though not a technical definition for microplastics since there are no provisions that specifically address microplastics. The County will note this comment for inclusion in information in educational and outreach materials developed during the implementation phase if the ordinance is adopted.
57		Consider reusable foodware pilot programs for take-out/to-go to ultimately transition food facilities to use reusables instead of single-use plastics of disposable options.	Comment acknowledged, and the County will note this suggestion during the implementation phase if the ordinance is adopted.
58		The County should have focus groups with BIPOC and low-income communities, street vendors and locally-owned small businesses to help shape reusable pilot programs, based on reuse models implemented in other areas, and to determine where pilot programs should be launched.	See response to comment #57.
59		County should develop market landscape analysis of BIPOC, locally owned small businesses that offer reusable foodware to be included in directory or toolkit to incentivize local innovation.	See response to comment #57.
60		Develop educational materials, technical assistance and support programs for small businesses to support transition to reusable dine-in foodware, including directory/toolkit for small businesses that is multilingual and easily accessible, and one-time up-front funding for infrastructure, staffing, reusables, utilities based on eligibility criteria.	See response to comment #30.
61		Consider sliding scale on enforcement fees based on revenue/size of business.	Comment acknowledged. The County will have flexibility on how and when to issue violations and fines and will take this suggestion under consideration.

	Organization/Affiliation	Comment	Response
62	East Yards Communities for Environmental Justice (cont'd)	Consider passing fees on to plastic manufacturers and plastic feedstock facilities instead of businesses and customers.	Comment acknowledged.
63		How will funds from violation fines be used? Can they be used to help locally-owned, small businesses transition to reusables (ex. Infrastructure, employees, programs to cut or discount water/electricity bills)?	See response to comment #30.
64		Can the County provide more information on what the non-punitive enforcement approach will look like?	See response to comment #30.
65	Foodservice Packaging Institute	FPI fully supports policies and programs that result in more recycling/composting of foodservice packaging.	Comment acknowledged.
66		FPI opposes restrictions that limit the use of any foodservice packaging. Packaging should compete on its own merits of performance, suitability, price, and impact on environment. Free market approach allows businesses to determine most effective product that fits their business model.	Comment acknowledged.
67		FPI opposes prohibition on foam polystyrene food service ware, which will will impact restaurant and retail supply chains. Limiting choice, material access, and potential increased costs will hamper recovery and operations of businesses.	Comment acknowledged.
68		FPI opposes reusables for dine-in requirements. Studies show sanitary benefit of single use items as compared to reusables.	See response to comment #54.
69		Mandating reusables may lead to increased use of energy, water and chemicals to wash and dry items.	See response to comment #25.
70		There are staff and operational considerations for restaurants related to reusables, including storage, breakage/theft, and staffing to collect and wash.	See response to comment #24.
71		FPI has several groups to bring together supply chain to develop and promote economically viable and sustainable recovery solutions for foodservice packaging (Paper Recovery Alliance, Plastic Recovery Group, Paper Cup Alliance, Foam Recycling Coalition).	Comment acknoowledged.
72		Important to make sure recylables and compostables will actually be recycled or composted.	Comment acknowledged.
73		FPI encourages expansion of infrastructure to improve recovery of all foodservice packaging.	Comment acknowledged.
74		Welcome the opportunity to work with County and local recyclers/composters to ensure that products can and will be recycled/composted.	Comment acknowledged. The County welcomes partnership in addressing these issues.
75	Go2Zero Strategies	Few faciities in the County are accepting compostable food service ware in the organics bin. It is impossible to verify if a product is PLA and plastic free, which leads to customer confusion and frustration. Need to make it clear that these items are rarely composted and continue to be disposed just like plastics.	See response to comment #15.
76	Hospital Association of Southern California	HASC is concerned about the impact and timing of this ordinance on hospitals. Members are ready and willing to partner on efforts around single use plastics, but hospitals are still dealing with impacts from the pandemic.	Comment acknowledged.

	Organization/Affiliation	Comment	Response
77	Hospital Association of Southern California (cont'd)	Ordinance relief options run counter to core values of hospitals. Members do not want to publicly file for undue hardship or undermine public trust. Hospitals do not want to be in a situation where communities are filing complaints about cafeterias since hospitals are community partners in caring for health of environment.	There is no intention for the hardship process to be public. Waivers and extensions will be managed on a case by case basis directly with County staff.
78		HASC is concerned that hospitals were not engaged as a group earlier in the discussion and hope that HASC can be a resource to the County moving forward.	Comment acknowledged.
79		HASC is concerned about impact of AB962 related to supplier diversity procurement and asks that the County provides supplier information that is compliant with AB962 requirements.	Comment acknowledged and will be noted for the implementation phase if the ordinance is adopted.
80		Suggest the following language for emergency supply waiver: “The requirements of this Chapter do not apply to supplies and services provided DURING a natural disaster or an emergency that is declared by the LA County BOS, or the State or Federal government”	County staff reviewed the proposed language and noted that this wording may be read very broadly to encompass any services being provided during an emergency, not just those that are actually related to the emergency. It is not clear why ordinance requirements would have to be suspended for all operations, including non-emergency ones, especially if facilities have until then been meeting the requirements of the ordinance.
81		Request that hospitals be included in the extended implementation timeline due to the recovery period after the public health emergency.	Comment acknowledged. The County understands that there is concern with supply chain issues, and has the ability to institute waivers if these issues persist in a year's time when the ordinance requirements go into effect. County staff intend to monitor this situation closely.
82	Jack in the Box	With the challenges regarding the supply chain, looking to do things from a sustainability standpoint at this time will create much more panic, especially for organizations that have a heavy footprint in LA County.	See response to comment #4.
83		Understand that this study was being looked at prior to COVID and was on hold early on due to COVID, but the supply chain challenges are still here and do not show any end in sight. Ask the team to seriously take this into consideration when looking to adopt the ordinance.	Comment acknowledged.
84		What's the time-frame for ordinance to go into effect and what ‘grace period’ will be given?	"Brick and mortar" food facilities and retail establishments will have ~~about~~ a year after ordinance adoption to achieve compliance. Food trucks will have 18 months, and temporary food facilities will have two years.

	Organization/Affiliation	Comment	Response
85	Little Rock Town Council	Because of this program I have a mountain of reusable bags. Maybe recycled paper or biodegradable bags would be better.	Comment acknowledged.
86	Los Angeles County Business Federation	BizFed shares concerns on environmental impacts of single-use plastics in landfills, support efforts to increase recycling and limit non-compostable items entering environment.	Comment acknowledged.
87		Expanded polystyrene foam and plastic food containers are the most efficient for keeping food fresh, providing insulation at an affordable price and should not be banned.	Comment acknowledged.
88		Transitioning to compostable food service ware is not viable given the impacts of the pandemic, compliance costs, supply chain issues, especially when many restaurants have high overhead and thin profit margins.	See response to comment #4.
89		Removing single use plastics for indoor dining fails to consider land use limitations. Many restaurants lease their space and don't have dishwashers to accommodate reusables, or the costs of the machines and utilities make this option unviable.	See response to comment #24.
90		Ask that sustainability office consider the economic impacts of the ordinance on small businesses before presenting it to the County, and if the office moves forward to make recommendations that would relieve the financial burden of compliance.	Comment acknowledged.
91	NatureWorks LLC	Will end of life programs that LA County pursue have any bearing on and/or be in conflict with the City of Los Angeles?	Since the proposed ordinance only applies to unincorporated portions of Los Angeles County, it should not have an impact on programs within the City of Los Angeles.
92		Successful use of Certified Compostables will contribute to the diversion of more food and compostable packaging waste in closed venues. Success here requires this resulting two component waste stream to be accepted by commercial composters. How is the latter being addressed?	See response to comment #15.
93		A comment from the initial call noted composters will only accept or require products that meet OMRI/NOP and/or are certified organic. Many commercial composters (ie based in the NW/Midwest/NE/SE/etc.) generate two if not more forms of resulting end compost - certified and also “non-certified” organic compost. Will LA County be enlisting commercial composters that can generate multiple end use compost formats?	See response to comment #15.
94	Neighborhood Council Sustainability Alliance	Strongly in support of ordinance, as are many other people in LA County. It will reduce the enormous plastic pollution as well as the overall waste going to landfil. It is long overdue.	Comment acknowledged.
95	Newlight Technologies	Expressing support for LA County's policy leadership and the recommended ordinance.	Comment acknowledged.
96		Supports proposal to define "compostable" as meeting rigorous certification standards.	See response to comment #15.
97		Replacing single use plastics with compostable products presents numerous benefits including compliance with SB1383, reducing non-compostable and non-recyclable solid waste, and decreasing litter.	Comment acknowledged.

	Organization/Affiliation	Comment	Response
98	Pacoima Beautiful	Glad that there is movement on this topic.	Comment acknowledged.
99		Will unincorporated areas feel singled out because the ordinance only applies to them?	The County only has jurisdiction over unincorporated areas on this issue, so that is why the applicability of the ordinance is limited.
100		Is this a pilot which is intented to expand to the entire County eventually?	See response to comment #99.
101		France has moved to ban plastic packaging for the majority of fruits and vegetables. Could the County eventually do this?	See response to comment #32.
102	Paddle Out Plastic	Appreciate County tackling this issue. Need to address problem at the source. Org recruits paddlers to clean up SoCal waterways which is sorted, counted, etc. Nearly all litter is various forms of plastic, and stream seems to be increasing.	Comment acknowledged.
103		Strongly support ban on sale/rental of EPS. One third of litter retrieved from water in 2021 was polystyrene, and had to leave behind a lot because many were tiny bits that couldn't be retrieved [included pictures in e-mail].	Comment acknowledged.
104		Durability of product is related to environment in which its used - cheap EPS boogie boards and kick boards become single-use when used at the beach. Consider developing design standards for products such as boogie boards to ensure that they are reusable many times, and consider attaching a deposit to the purchase.	Comment acknowledged, and the County will note this suggestion for future work.
105		Consider expanding prohibition from retail sale and rental to include use at LA County facilities, including harbors, beaches, and parks.	See response to comment #32.
106		Consider applying polystyrene prohibition to all food service ware including meat trays, etc. if this is not already included	This is included in the current draft provisions.
107		Consider expanding application of prohibition to foam fabric - we find full sheets of this as well as ripped pieces in the water.	Comment acknowledged, and the County will note this suggestion for future work.
108		Consider applying prohibition on polystyrene to street vendors if that is not already the intention	The County is currently undergoing a review of its permitting program for street vendors, and will note this suggestion for that process.
109		Consider including retail establishments to requirements for compostable/recyclable food service ware.	See response to comment #32.
110		Strongly support single use plastic items not being considered recyclable	Comment acknowledged.
111		Reusable food service ware for dine-in requirement is important since org has seen restaurants use disposables to avoid dishwashing. Consider extending this to all food facilities as well as to programs like Meals on Wheels.	See response to comment #29.
112		Consider requiring certification of compliance when renewing business licenses, funding compliance accountability through fines, and providing incentives to jump start compliance.	See response to comment #30.

	Organization/Affiliation	Comment	Response
113	Paddle Out Plastic (cont'd)	Concerned that exemption for articles packaged off premises will lead to circumvention of ordinance requirements	See response to comment #32.
114		Food facilities in health facilities such as nursing homes and hospital cafes and cafeterias should not be exempt	The draft ordinance provisions would currently be applicable to these types of facilities.
115		Re: exemptions where there are no appropriate compostable or recyclable alternatives, consider adding "or reusable." With this exemption available, plastic bottles should be added to the list of prohibited food and beverage ware, e.g. water is available in recyclable aluminum cans and Coca Cola recently announced moving to reusable beverage containers	See response to comment #32.
116		Consider attaching a fee to the use of non-recyclable items that continue to be used as an incentive to move to reusables.	See response to comment #32.
117		Re: waiver related to dishwashing facilities, this should only be granted if there are no reasonably accessible facilities offering dishwashing or reusable food service ware to restaurants.	See response to comment #32.
118		Consider shortening time for compliance - plastic problem is growing every day, as do GHG emissions, and expansion of plastic production facilities in already impacted communities.	Comment acknowledged. The County believes the timeline in the ordinance is necessary to give the ordinance the best chance of successful implementation, as it will allow the County time to do education and outreach as well as to allow businesses to understand and align with the requirements.
119		Re: enforcement, this is where well-meaning ordinances fail and compliance timeline can essentially be extended for years.	See response to comment #17.
120		Important to prioritize education, including to offset disinformation and misinformation, for example perpetuating myth that reusables are not sanitary. Public also deserves to understand why ordinance is vital.	See response to comment #79.
121		Consider offering a sticker for facilities indicating that they have switched to compostables and reusables	See response to comment #79.
122		Consider adding a prohibition on sale, distribution and use of balloons, if not entirely, at least at beaches, harbors, parks, and other outdoor venues and county events.	See response to comment #32.
123		Increase availability of public water refill stations	See response to comment #32.
124		Consider prohibiting non-compostable produce bags and distribution of plastic bags by all retailers, and require fees for paper and other bags. Consider pairing this with education and distribution of reusable bags, focusing on disadvantaged communities.	See response to comment #32.
125		Need to take bold action now to encourage reuse before more expansion of plastic production.	Comment acknowledged.
126	Public - Bessie Politis, REHS	FDA food code currently prohibits the use of reusables for TCS foods. The language within your motion uses reusables as an alternate to single use which is not a solution based on current code. While there is work on going to adjust the law, operators in the food industry would not have this as a viable alternative.	The ordinance requirements are limited to dine-in customers at full service restaurants. There are well-established guidelines for restaurants to use their own reusable service ware, and those would be followed here.
127		There are not enough companies producing alternate materials for single use, creating a monopoly for companies currently selling alternate single use items.	Comment acknowledged.

	Organization/Affiliation	Comment	Response
128	Public - Bessie Politis, REHS (cont'd)	Businesses are struggling enough during this pandemic. For the Board to bring this matter up now is not only insensitive, it exhibits a lack of empathy for the added burden food operators will now have to add to their already heavy load.	See response to comment #4.
129		Recycable trust by consumers should be your first concern. Consumers do not trust that the efforts made to recycle are being done in an environmentally trustworthy manner by the County. County owned buildings, County occupied buildings do not have strong recycling programs. You must set by example to gain the by in of businesses.	The Board of Supervisors recently adopted a single use plastics reduction policy for County facilities, which includes provisions for waste-free events, that is in the process of being implemented.
130	Public - Elinor Crescenzi	Compostable is still disposable and involves excess waste. Switching from plastics to compostables is a step in the right direction, but not as good as reusables when made of appropriate materials.	Comment acknowledged.
131		Move towards purchase of reusables for to-go options. Restaurants should be required to provide reusable to-go options and utensils, and charge for them to incentivize customers to bring their own containers and utensils. This will also promote the normalization of reusables.	See response to comment #32.
132		Exemptions to reusables requirement for full service restaurants should only be on a highly temporary basis and should be difficult to obtain. Business should have to demonstrate why they cannot wash reusables using 3-bin system or contract with a dishwashing service.	See response to comment #32.
133		Re: reusable requirement, County could develop temporary systems for rental or loan to businesses under construction or other common reasons for not being able to wash dishes.	See response to comment #32.
134		Support substantial education and support services for compliance, however proposed fines are not adequate as a deterrent for businesses who have ignored other communications, education, and support opportunities. This could be seen as preferable over managing a reusable system in cost-benefit analysis. Consider much more serious consequences such as business closures - should treat environmental health issues similar to how we would deal with public health issues. Plastics are also a public health issue.	See response to comment #17.
135		Consider a solid and well-funded program to bring all unincorporated businesses into compliance which can serve as a model pilot program for incorporated municipalities. Consider using a lottery system to create cohorts to focus resources and attention on each business.	See response to comment #79.
136	Public - Dyanne DiRosario	When RecycLA program was rolled out, engagement did not include landlords or housing representatives. If this ordinance will impact tenants' trash, please bring in landlords or housing stakeholders to the program has a chance to succeed.	Comment acknowledged.

	Organization/Affiliation	Comment	Response
137	Public - Tim Mellin	Can you add wording to eliminate plastic grocery bags at stores?	See response to comment #32.
138		Need to make sure ordinance is enforceable	Comment acknowledged.
139	Reusable LA Coalition Letter: Heal the Bay	Strongly support the LA County effort to pass an ordinance to limit single-use plastics in unincorporated areas. Excited to see County taking initiative on this issue which is not only polluting essential ecosystems but also impacting vulnerable communities.	Comment acknowledged.
140	Adventures in Waste 5 Gyres Institute SoCal 350 Clean Water Fund	Strongly support plastic items being excluded from "recyclable" definition, however definition should expressly exclude incineration or any form of chemical recycling [letter proposes specific language for definition].	See response to comment #31.
141	The Bay Foundation Upstream Solutions Resilient Palisades Oceanic Global	Current definition of "compostable" is insufficient to guarantee that products can actually be collected and processed in LA County. Should be modeled after recyclable definition and exclude bioplastics [see suggested language].	See response to comment #15.
142	LA Waterkeeper Plastic Pollution Coalition r.Cup LLC The Last Plastic Straw	Strongly support "reuse for dine-in" requirement, but recommend that it is expanded to apply to all food facilities. This requirement has been enacted in nine other jurisdictions with no exclusions for fast casual and fast food facilities.	See response to comment #29.
143	Break Free From Plastic Surfrider Foundation - LA Chapter AltaPasa Green Circle Story of Stuff	ReThink Disposable has worked with 260 restaurants in California to help them transition to reuse for onsite dining, and have demonstrated overwhelming success in achieving net cost savings, waste reduction, and greenhouse gas emissions reductions.	Comment acknowledged.
144	Climate Reality LA Throop Unitarian Universalist Church Oceana Sierra Club - Angeles Chapter Habits of Waste Neighborhood Council Sustainability Alliance	Since start of pandemic, many food facilities have changed internal policies to no longer accept customer-provided reusable foodware, even though allowed by State and County DPH, often due to misinformation. Urge County to add requirement that would require food facilities to accept customer reusables [see suggested language].	See response to comment #32.
145	Amigos de los Rios Surfrider Foundation - South Bay Chapter	It would be in the best interest of all Angelenos for LA County and City to coordinate efforts. Strongly encourage County to coordinate with City on any CEQA related processes or assessments.	Comment acknowledged.
146	The Nature Conservancy	TNC supports the draft ordinance that would reduce or eliminate single use plastics food service ware and ensure disposables are actually recyclable in practice or compostable.	Comment acknowledged.
147		TNC emphasizes and supports the following key finding from the UCLA report that replacing single use plastics with reusable products would result in net environmental and economic benefits.	Comment acknowledged.
148		TNC commends the County for engaging stakeholders from environmental and environmental justice organizations, plastics industry, restaurant industry, waste industry, academic institutions, and local jurisdictions.	Comment acknowledged.

	Organization/Affiliation	Comment	Response
149	The Nature Conservancy (cont'd)	Recommend continuing engagement of diverse stakeholders throughout process to hear from different voices and address concerns as they arise.	See response to comment #79.
150		Draft ordinance is complementary to statewide efforts to address single-use plastic pollution. TNC is supporting the California Plastic Pollution Reduction and Recycling Act. Coordinated local and state action is critical to stop plastic pollution.	Comment acknowledged.
151	Upstream	Strongly support County's effort to pass an ordinance to limit single-use plastics.	Comment acknowledged.
152		Upstream is a member of ReusableLA Coalition and has signed on to their letter, but would like to emphasize potential cost savings for restaurant sector and waste savings for local government as a reason why County should prioritize reuse for on-site dining policy for all restaurants and implement as soon as possible.	Comment acknowledged.
153		Limiting the reuse requirement to full-service restaurants would have a very small impact. Expanding it to include all food service restaurants would provide significant cost and waste benefits.	See response to comment #29.
154		Reusable San Mateo County did waste and cost assessment for Redwood City [assessment is attached to letter], which reviewed all 244 restaurants in City. Assessment found largest users of disposables are fast food restaurants and café/bakery/snack facilities.	Comment acknowledged.
155		Assessment found that policy would not save full service restaurants money, but would save fast food restaurants over $8k per year, fast casual $4600/yr, and café/bakery/snack businesses $4300/year. These are net cost savings after accounting for purchase of reusables and dishwashing and operational changes.	Comment acknowledged.
156		Waste savings from this policy approach are greater than any other proposed policy. In Redwood City analysis, average waste reduction per restaurant per year would be 1600 lbs.	Comment acknowledged.
157		According to County Restaurant and Retail Food Inspection reports, there are over 26,000 restaurants in County. Using Redwood City estimates, waste reduction would be 41,600,000 lbs per year, and net cost savings would be $132,990,000 per year.	Comment acknowledged.
158		This requirement has been enacted in nine other California jurisdictions with no exclusions for fast food and fast casual, including McDonalds in Berkeley.	Comment acknowledged.
159		ReThink Disposable has worked with 260 restaurants in California to help them transition to reuse for onsite dining, and have demonstrated overwhelming success in achieving net cost savings, waste reduction, and greenhouse gas emissions reductions.	Comment acknowledged.

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CEQA FINDINGS

The Board of Supervisors finds that the Reduction of Waste from Single-Use Food Ware and Expanded Polystyrene Products Ordinance ("Ordinance") is categorically exempt from the California Environmental Quality Act ("CEQA") pursuant to Sections 15307 (Class 7) and 15308 (Class 8) of the State CEQA Guidelines because it consists of a regulatory action that will assure the maintenance, restoration, or enhancement of a natural resource and the maintenance, restoration, enhancement, or protection of the environment. Furthermore, none of the exceptions contained in Section 15300.2 of the CEQA Guidelines applies.

The Board of Supervisors makes the following specific findings:

A Significant Amount of Single-Use Plastic Food Service Ware Becomes Litter or is Otherwise Improperly Disposed Of

1. Single-use plastic food service ware accounts for a tremendous amount of the litter that blights our beaches and pollutes waterways. According to the National Oceanic and Atmospheric Administration ("NOAA"), most of the litter that ends up in beaches and waterways consists of single-use plastic. A significant portion of that waste consists of single-use plastic food service ware such as food wrappers, plastic beverage bottles, plastic bottle caps, plastic/foam carryout containers, and drinking straws, as well as plastic bags.[1]

2. Most of the plastic waste that ends up on beaches and in waterways originates from inland sources and is transported to beaches and waterways through urban runoff. This results from littering and illegal dumping, as well as the accidental release of plastic waste that blows into the environment from trash containers, trash trucks, and landfills.[2]

3. Globally, up to 32 percent of plastic packaging ends up leaking into the environment.[3]

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[1](NOAA, Plastic Marine Debris <https://marinedebris.noaa.gov/sites/default/files/publications-files/2018_Plastics_Fact_Sheet.pdf> [as of Mar. 30, 2022]; see also NOAA, TRASH TALK: Marine Debris and Plastics ("The 5 most common items found during the International Coastal Cleanup are plastic cigarette butts, food wrappers, plastic beverage bottles, plastic bottle caps, and plastic straws & drink stirrers.") <https://marinedebris.noaa.gov/videos/trash-talk-marine-debris-and-plastics> [as of Mar. 31, 2022].) According to the California Coastal Commission, approximately 30 percent of the litter that is collected from California beaches during Coastal Cleanup days consists of single-use food service ware, including food wrappers and containers, cups, plates, utensils, and beverage containers. (Cal. Coastal Com., California Coastal Cleanup Day History <https://www.coastal.ca.gov/publiced/ccd/history.html> [as of March 30, 2022]; Midbust et al., Bren School of Environmental Science & Management, U.C. Santa Barbara, Reducing Plastic Debris in the Los Angeles and San Gabriel River Watersheds (hereafter MESM Report) (2014), pp. 30-31 <https://bren.ucsb.edu/projects/reducing-plastic-debris-los-angeles-and-san-gabriel-river-watersheds?msclkid=14549a59af9211eca4f9318abe102bbe> [as of March 30, 2022].)

[2] (Coffee et al., UCLA Luskin Center for Innovation, Plastic Waste in Los Angeles County: Impacts, Recyclability and the Potential for Alternatives in the Food Service Sector (hereafter Luskin Report) (2020), pp. 8-10 <https://ceo.lacounty.gov/wp-content/uploads/2022/03/Plastic-Waste-in-Los-Angeles-County.pdf> [as of Mar. 31, 2022]; MESM Report at pp. 11, 15, 35-36.)

[3] (Edmond, *The New Plastics Economy: Rethinking the Future of Plastics* (Jan. 19, 2022) World Economic Forum <https://www.weforum.org/agenda/2022/01/plastic-pollution-climate-change-solution/> [as of Mar. 31, 2022].)

4. When expanded polystyrene products are not properly disposed of, and even when they are properly disposed of, they are susceptible to dispersion by wind and storm water due to expanded polystyrene's lightweight and buoyant nature.[4]

Single-Use Plastics Cause Harm to Marine Environments, Human Health, and Local Communities

5. As discussed in the resolution entitled "End plastic pollution: Towards an international legally binding instrument," which was adopted by the United Nations Environment Assembly of the United Nations Environment Programme ("UNEP") on March 2, 2022, "the high and rapidly increasing levels of plastic pollution represent a serious environmental problem at a global scale, negatively impacting the environmental, social and economic dimensions of sustainable development."[5] The resolution specifically identified impacts of plastic on the marine environment.[6]

6. Once it enters the environment, plastic does not break down the way natural materials do and may never fully go away.[7] As plastic is exposed to the sun, salt water, and movement from waves, it can fragment and break up into smaller and smaller pieces, called microplastics, which measure less than five millimeters in length.[8]

7. Microplastics are ubiquitous. They have been found from Mount Everest to the Mariana Trench.[9]

8. Plastics cause severe harm to animals—particularly to marine wildlife such as seabirds, fish, and marine mammals—through biotic consumption, entanglement, modification to benthic habitats, the spread of invasive species, and the transfer of chemicals to animal tissues.[10]

9. There is an increasing body of evidence suggesting that plastics in the environment may also be harmful to humans. For example, in one study, plastic was found in the placentas of newborn babies. In addition, harmful chemicals can leach into food from plastic food ware, especially when heated.[11]

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[4] (Wagner, *Policy Instruments to Reduce Consumption of Expanded Polystyrene Food Service Ware in the USA* (2020) 9 Detritus 11 <https://doi.org/10.31025/2611-4135/2020.13903> [as of March 30, 2022].)

[5] The UNEP adopted this resolution on March 2, 2022. (UNEP, Historic day in the campaign to beat plastic pollution: Nations commit to develop a legally binding agreement (Mar. 2, 2022) <https://www.unep.org/news-and-stories/press-release/historic-day-campaign-beat-plastic-pollution-nations-commit-develop> [as of Mar. 31, 2022].).

[6] *(Ibid.)*

[7] (Off. of Response & Restoration, Nat. Oceanic & Atmospheric Admin., U.S. Dept. of Commerce, What Is Marine Debris?: Plastic (July 18, 2013) <https://marinedebris.noaa.gov/what-marine-debris/plastic> [as of March 30, 2022].)

[8] (*Ibid.*; Luskin Report, *supra*, at p. 10.)

[9] (Nat. Geographic Society, Resource Library Encyclopedic Entry: Microplastics (July 1, 2019) <https://www.nationalgeographic.org/encyclopedia/microplastics/> [as of Mar. 31, 2022].

[10] (Luskin Report, *supra*, at p. 10; MESM Report, *supra*, at pp. 32-33.

[11] (Luskin Report, *supra*, at pp. 11-12.)

10. Microplastics that enter the human body through ingestion or inhalation can lead to inflammation, geno-toxicity, oxidative stress, apoptosis, and necrosis, and have been linked to negative health outcomes including cancer, cardiovascular disease, inflammatory bowl disease, diabetes, rheumatoid arthritis, chronic inflammation, auto-immune conditions, neurodegenerative disease, and stroke.[12]

11. Plastic pollution at local beaches and waterways reduces the quality of life for Los Angeles County residents and potentially impacts tourism.[13]

12. Los Angeles County and other local jurisdictions are required to spend millions of dollars to address pollution caused by plastic litter, prevent it from entering or remove it from the waterways, as required by law.[14]

13. Even when single-use plastic food service ware is properly disposed of, it typically ends up in landfills, takes up valuable landfill space, and can take decades or centuries to break down.[15]

14. Studies have shown that plastic products also emit methane and other greenhouse gases when they decompose.[16]

15. Changes in consumer and retailer behavior in light of the COVID-19 pandemic have led to an even greater use of plastic packaging. This suggests that the environmental damage caused by single-use plastic has also increased, making the problems more urgent than ever.[17]

16. By prohibiting food facilities from using most types of single-use plastic food service ware and prohibiting retail establishments from selling products made of expanded polystyrene, but allowing food facilities to use either reusable, fiber-based compostable, or non-plastic recyclable products instead, the Ordinance will protect the environment and natural resources by reducing the amount of plastic waste that litters the environment, makes its way to the oceans and other bodies of water, and causes harm to marine life and to human health. The Ordinance will also reduce the amount of single-use plastic that takes up space in landfills without breaking down.

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[12](Center for Internat. Environmental Law, Plastic & Health: The Hidden Cost of a Plastic Planet (Feb. 2019) <https://www.ciel.org/wp-content/uploads/2019/02/Plastic-and-Health-The-Hidden-Costs-of-a-Plastic-Planet-February-2019.pdf> [as of March 30, 2022].)

[13] (Luskin Report, *supra*, at p. 8.)

[14] (*Id.*at p. 10.) The nonprofit Natural Resources Defense Council reported that the largest California communities spend an average of up to $4.4 million in annual street sweeping and $2.3 million in manual land litter cleanup. (*Ibid.* [citing Jahn et al., Waste In Our Water: The Annual Cost to California Communities of Reducing Litter That Pollutes Our Waterways (2013) <https://www.nrdc.org/sites/default/files/oce_13082701a.pdf> [as of March 30, 2022].)

[15] (*Id.* at pp. 8, 13, 14, 20.)

[16] (*Id.* at p. 34; Royer et al., Production of methane and ethylene from plastic in the environment (2018) <https://doi.org/10.1371/journal.pone.0200574> [as of March 30, 2022].)

[17] (October 2021 Addendum to the Luskin Report (hereafter Luskin Addendum) <https://ceo.lacounty.gov/wp-content/uploads/2022/03/Revisiting-Plastic-Waste-in-L.A.-County-Oct-2021.pdf.> [as of Mar. 31, 2022].)

Requiring Food Facilities to Use Reusable Food Service Ware Would Provide the Greatest Environmental Benefits, But is Not Always Feasible

17. Replacing single-use food service articles with reusable food service ware provides an environmental benefit compared with other types of food service ware.[18] However, requiring reusable food service ware is not feasible for many food facilities at this time, because it would require these food facilities to invest in new equipment and rework everyday business practices. The Board has decided that it is reasonable to require full-service restaurants to use reusable food service ware for most applications, when serving dine-in customers, but that the Ordinance will not require other food facilities to use reusable food service ware. However, the Ordinance will require that all single-use food service ware that food facilities serve to customers with ready-to-eat food be either recyclable or compostable, except to the extent that a recyclable or compostable item is not readily available or that compliance with this requirement will cause an undue hardship to a food facility.

It is Not Feasible to Recycle Most Single-Use Plastic Food Service Articles

18. Despite the public perception that plastic is recyclable, and although technically most plastic can be recycled, in the Los Angeles region, most single-use plastic food service articles are not recycled. Less than 15 percent of single-use plastics in the state of California are recycled,[19] and the recycling rate for single-use plastic food service articles is even less, for the reasons discussed below.

19. It is economically and practically infeasible to recycle most single-use plastic food service articles. Single-use plastic food service articles are challenging to recover due to contamination with grease and other food residues, because recycling machinery that is currently available is unable to remove food contamination. Because single-use food service ware is typically contaminated with food, it is very difficult to recycle.[20]

20. In addition, due to their small size and light weight, items such as straws and utensils are hard to process and bale in a manner that is efficient enough to be sustainable.[21] Larger items, due to their light weight, can be difficult to mechanically sort.[22] Moreover, single-use plastic food service ware that is recyclable may still end up as litter, polluting the waterways and causing harm.

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[18] (Luskin Report, *supra*, at pp. 27, 28; Upstream, the Economic and Business Case for Transitioning from Single Use to Reuse in Food Service <https://static1.squarespace.com/static/5f218f677f1fdb38f06cebcb/t/60c9f274b430d0542e1b40dd/1623847549168/Reuse+Wins_Executive+Summary.pdf> [as of March 30, 2022].)

[19] (Wisckol, *Your Recyclables Are Going to the Dump and Here's Why* (May 17, 2019) The Orange County Register <https://www.ocregister.com/2019/05/17/your-recyclables-are-going-to-the-dump-heres-why/#:~:text=Less%20than%2015%20percent%20of,the%20sponsor%20of%20SB%2054> [as of March 30, 2022].)

[20] (Luskin Report, *supra*, at pp. 20, 24, 25.)

[21] (*Id.* at p. 25.)

[22] (*Ibid.*)

21. Even when plastics can be recycled, the resulting product is of lower quality than new material, so recycling of plastic may reduce, but would not eliminate the manufacture of new plastic from fossil fuels.[23]

22. Expanded polystyrene based products can be particularly difficult to recycle and can be actively detrimental to recovery operations as expanded polystyrene's lightweight and easily fragmented nature makes it prone to contaminating other recoverable materials. Furthermore, expanded polystyrene food service articles tend to absorb more grease and oil than other commonly used plastics, making it more difficult to recycle.[24]

23. As a result of China's National Sword Policy, which was enacted in 2018, China no longer accepts many types of plastic and other materials that countries such as the United States previously shipped to China for recycling, and only accepts the most valuable items, and other countries followed suit.[25] China's implementation of this policy has decreased the value of items that were previously considered recyclable, and increased the amount of single-use plastic products that are being landfilled in the United States. The policy also highlights the fact that much of the plastic that previously was sent to China for recycling was not actually recycled, but instead was incinerated, dumped or landfilled within China.[26]

24. Even if single-use food service ware is recyclable, it is harmful to marine life and human health if it becomes litter and makes its ways to the local storm drains, waterways and the ocean, for the reasons set forth in findings 1 through 15.

Single-Use Food Service Ware that is Fiber-Based and/or Certified Home Compostable Is Less Damaging to Waterways and Human Health than Single-Use Food Service Ware Made from Plastic

25. The UCLA Luskin Center For Innovation prepared a report in January 2020 entitled Plastic Waste In Los Angeles County ("Luskin Report") which concluded that replacing single-use food service articles with compostable products will likely produce environmental benefits if certain safeguards are in place.[27]

26. The Luskin Report discussed challenges associated with single-use food service articles that purport to be compostable. Products that are marketed as compostable but contain intentionally added fluorinated chemicals such as per- and polyfluoroalkyl (PFAS) are problematic because of concerns about their impact on human health.[28] Therefore, the

[23] (*Id.* at pp. 20-21.)

[24] (*Id.* at p. 24.)

[25] (CalRecyle, International Policies Affecting Global Commodity Markets <https://calrecycle.ca.gov/markets/nationalsword/globalpolicies/> [as of March 31, 2022].)

[26] (Luskin Report, *supra*, at p. 25.)

[27] (*Id.* at pp. 6, 31.)

[28] (*Id.* at p. 36.)

Ordinance will require that, in order to be considered compostable, single-use food service articles be free of such contaminants.

27. Compostable single-use food service ware items that are free from all intentionally added fluorinated chemicals, including PFAS, and that are certified to biodegrade at moderate temperatures in a home composting bin and/or are fiber-based, will typically break down in the environment in the event that they become litter, thereby causing less damage to the waterways, marine life and human health than single-use plastic food service ware.[29]

Single-Use Food Service Ware that is Fiber-Based and/or Certified As Home Compostable, Can Be Diverted From Disposal and Composted or Anaerobically Digested

28. Like single-use food service ware made from plastic, single-use food service ware made from materials other than plastic, such as paper or cardboard, tend to be difficult and infeasible to recycle if it is soiled with food.[30] Single-use food service ware that is fiber-based, however, even if it is contaminated with food, can be diverted from disposal and composted or anaerobically digested.

29. The Luskin Report notes that it is less efficient for composting facilities to process compostable packaging, compared with food waste and green waste. However, many composting facilities accept "food-soiled paper" that is mixed with food waste.[31] Food-soiled paper is paper that is soiled with liquid or solid food waste, and includes products such as napkins and tissues, paper plates and cups, to-go containers, food-service wrappers, pizza boxes, and cardboard produce boxes. Food-soiled paper thus includes the types of single-use food service articles that are covered by the Ordinance when they are made from fiber-based materials. Food-soiled paper that is mixed with food waste can be composted along with food waste.[32]

30. While compostable food service ware has historically been less desirable than food waste from the standpoint of the operator of an anaerobic digestion facility, there is no barrier to accepting compostable food service ware products if they have appropriate incentives.[33]

31. One of the barriers to processing of bioplastic compostable food service ware is that it is difficult to distinguish from non-compostable food service ware, and processing facilities that do not want to spend the resources to separate compostable from non-compostable

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[29] Luskin Report at p. 34; See also An Assessment of Policies on Polystyrene Food Ware Bans (2012), San Jose State University, which can be accessed at the following link as of March 30, 2022: https://scholarworks.sjsu.edu/cgi/viewcontent.cgi?referer=https://scholar.google.com/&httpsredir=1&article=1265&context=etd_projects , at p. 24.

[30] Luskin Report, at p. 25.

[31] Luskin Report at p. 35; CalRecycle, SB 1383 Infrastructure and Market Analysis (April 2019), at p. 26 (stating that between 50 to 70 percent of composting facilities currently are able to accept food-soiled waste) <https://www2.calrecycle.ca.gov/Publications/Details/1652> [as of March 30, 2022].

[32] CalRecycle's Frequently Asked Questions (FAQs) regarding Assembly Bill 1826, which mandates organic waste recycling for businesses, FAQ 10, accessed at the following link as of March 30, 2022: https://www.calrecycle.ca.gov/Recycle/Commercial/Organics/FAQ.

[33] Luskin Report at p. 35.

food service ware will instead reject all food service ware.[34] However in October 2021, Governor Newsom signed several bills into law that help clarify consumer confusion and ensure that products are only labeled as compostable if they will break down in real life composting conditions, which will assist composting facilities to identify compostable products.[35]

32. Compostable food service ware has also been linked to higher rates of food waste capture, likely because customers can dispose of both packaging and food waste together in an organic waste receptacle.[36] A single bin system for food waste and packaging can be expected to reduce confusion among customers and reduce costs associated with collection and disposal of waste.[37] In accordance with regulations adopted by CalRecycle in accordance with SB 1383, Los Angeles County requires food facilities that are located in the unincorporated area to provide an organic waste receptacle in each location where they provide a trash receptacle, in order to divert organic waste from disposal in accordance with Senate Bill ("SB") 1383.[38]

33. The Biodegradable Products Institute ("BPI") and the Compostable Manufacturing Alliance ("CMA") are organizations that certify that products possess certain standards of compostability. In order to obtain BPI certification, a product must be free of PFAS.[39] Both BPI and CMA also test the products in accordance with ASTM D6400/D6868 standards which require that material aerobically biodegrades within 90-180 days in a municipal or industrial composting facility.[40] CMA provides field testing of materials to ensure that they break down as expected in real world conditions[41]. Fiber-based products and products certified as home compostable are preferable, because they will break down more quickly in the environment than non-fiber-based products that have BPI and CMA certification. Where no fiber-based product or product certified as home-compostable is

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[34] Luskin Report at 35.

[35] Office of Governor Gavin Newsom, October 5, 2021, which can be accessed at the following link as of March 30, 2022: https://www.gov.ca.gov/2021/10/05/governor-newsom-signs-legislation-to-tackle-plastic-pollution-promote-a-more-sustainable-renewable-economy-and-protect-californians-from-toxic-chemicals/ AB 1201, located at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220AB1201 (see also legislative history of SB 1201, describing the intent of the bill to require proper labeling in order to so that processors know which products are safe to compost, which encourages composting of compostable products- file://pappfshoa.hoa.lacoco.org/Jweissman_downloads$/202120220AB1201_Assembly%20Floor%20Analysis%20(3).pdf.)

[36] Luskin Report at p. 34.

[37] Luskin Report at p. 37.

[38] 14 Cal Code Regs §18984.9(b)(1); Los Angeles County Code, § 20.90.070A(2)(a).

[39] Luskin Addendum at p. 10; Information taken from BPI's website can be found at the following link as of March 30, 2022: https://www.bpiworld.org/Fluorinated-Chemicals.; information from CMA's website can be access at the following links as of March 30, 2022: https://compostmanufacturingalliance.com/2020/09/25/total-fluorine-analysis-requirements/;

[40] Luskin Report at p. 32; CMA website, which can be accessed at the following link as of March 30, 2022: https://compostmanufacturingalliance.com/?msclkid=10034108a63611ec824bc00855ed3332.; see also SITU Biosciences website, which can be accessed at the following link as of March 30, 2022: https://www.situbiosciences.com/product/astm-d6400-compostable-produc-test-composting/#:~:text=The%20standard%20ASTM%20D6400%20test%20series%20lasts%20a,environment%20as%20commonly%20found%20in%20standard%20compost%20facilities.?msclkid=073d7a93a63b11ec802728ee016ed0d5.

[41] Luskin Addendum, *supra*, at p. 10.

readily available for a specific application, however, products with BPI and CMA certification are the next best thing, as these products have advantages over products that are not certified to biodegrade within 90 to 180 days in a municipal or industrial composting facility. Therefore, in order for a single-use food service ware article to be considered compostable, the Ordinance requires that it be fiber-based and/or certified as home compostable, but the Ordinance authorizes the Director of Public Works to allow products with BPI and CMA certification where no fiber-based or home compostable items are available for a specific food service application.

34. Studies that evaluate the lifecycle impacts of compostable, versus plastic, disposable food service ware are inconclusive, and do not constitute substantial evidence of a significant impact associated with the Ordinance. The Oregon Department of Environmental Quality ("DEQ") conducted a study that has been cited for the proposition that compostable products can cause more negative impacts to the environment than plastic products.[42] However, this study does not assess the County's Ordinance; nor does it reach specific conclusions regarding environmental impacts associated with switching from plastic to compostable products. This study does not distinguish between types of food service ware labeled as compostable (e.g. whether the product is composed of bioplastic or fiber-based, whether it has been evaluated for actual compostability by a certification agency, whether it may contain fluorinated compounds, etc.), resulting in the highly variable conclusions the study reports.[43] In addition, the study acknowledges that key potential benefits of compostable materials could not be included in their assessment such as increasing diversion of food waste and sequestering of carbon through increased compost usage. One of the authors of the study stated in a Letter to the Editor in response to criticism of the study that the "DEQ did not find 'that the production of compostable packaging has a bad environmental footprint.' Rather, our key finding is that upstream impacts are both large and highly variable. Some compostable items are better, while others are worse."[44] The stated goal of the study was not to perform such a comparison, but rather to evaluate the usefulness of labels such as "compostable" themselves.[45] Other life cycle analyses have concluded that compostable products have a smaller environmental footprint.[46] Moreover, the Ordinance includes a provision

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[42] Allaway et al., State of Oregon Department of Environmental Quality, COMPOSTABLE – How well does it predict the life cycle environmental impacts of packaging and food service ware? (2018) <https://www.oregon.gov/deq/FilterDocs/compostable.pdf> [as of March 30, 2022]; Hawkins et al., State of Oregon Department of Environmental Quality, The Significance of Environmental Attributes as Indicators of the Life Cycle Environmental Impacts of Packaging and Food Service Ware (2018) <https://www.oregon.gov/deq/FilterDocs/MaterialAttributes.pdf> [as of March 30, 2022].

[43] See N. Goldstein, Editorial – The 2020 Compostable Packaging Narrative, which is available from the following link as of March 30, 2022; https://www.biocycle.net/editorial-2020-compostable-packaging-narrative/; see also D. Alaway, Recent BioCycle CONNECT Editorial misrepresents some of agency's research, which is available from the following link as of March 30, 2022: https://www.biocycle.net/letter-editor-oregon-deq-packaging-lcas/.

[44] See D. Alaway, Recent BioCycle CONNECT Editorial misrepresents some of agency's research, obtained from the following link: https://www.biocycle.net/letter-editor-oregon-deq-packaging-lcas/.

[45] Vendries J, Hawkins T, Hottle T, Mosley J, Allaway D, Canepa P, Rivin J, Mistry M (2018). The Significance of Environmental Attributes as Indicators of the Life Cycle Environmental Impacts of Packaging and Food Service Ware. State of Oregon Department of Environmental Quality. Portland, Oregon, p. 7

[46] Luskin Report, at p.33; see also https://www.worldcentric.com/journal/product-life-cycle/.

banning single use food ware for dine-in food facilities, and the County recently adopted an ordinance requiring that food facilities only provide single-use food ware accessories upon customer request, which will further reduce the total amount of waste from single-use food service ware. Because the Oregon study does not reach specific conclusions regarding environmental impacts associated with switching from plastic to compostable products, the Board finds that this study does not constitute substantial evidence of a significant impact associated with the Ordinance.[47]

35. In general, the results of life cycle analyses must be contextualized based on the assumptions and system boundaries set by the author. Because the results are highly dependent on these elements, the applicability of these types of studies to making holistic comparisons between products—especially in geographically specific situations such as this Ordinance—is currently limited for reasons including but not limited to:

    a. For instance, life cycle assessments cited by the Oregon DEQ study and identified by UCLA did not distinguish between specific types of compostables (e.g., fiber-based versus bioplastics).

    b. The life cycle assessments cited by the Oregon DEQ study and identified by UCLA did not cover the full scope of products covered by the proposed Ordinance.

    c. Life cycle assessments cited by the Oregon DEQ study and identified by UCLA did not account for recent changes in certifications that no longer allow fluorinated compounds.

    d. Some of the studies analyzed in the Oregon Study are relatively old and not reflective of current material technology (e.g., the Oregon study cited analyses from as early as 2008).

    e. These assessments also do not account for local regulations such as the SB 1383 regulations, which will increase collection and composting of these materials.

    f. As noted above, they also do not account for the benefits realized from increased food diversion that may result from use of compostable food ware, or the benefits of using compost, such as sequestering carbon or conserving water.[48]

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[47] See *Save the Plastic Bag Coalition v. City of Manhattan Beach* (Supreme Court, July 14, 2011) ("However, this case serves as a cautionary example of overreliance on generic studies of "life cycle" impacts associated with a particular product. Such studies, when properly conducted, may well be a useful guide for the decisionmaker when a project entails substantial production or consumption of the product. When, however, increased use of the product is an indirect and uncertain consequence, and especially when the scale of the project is such that the increase is plainly insignificant, the product "life cycle" must be kept in proper perspective and not allowed to swamp the evaluation of actual impacts attributable to the project at hand.").

[48] See D. Alaway, Recent BioCycle CONNECT Editorial misrepresents some of agency's research, obtained from the following link: https://www.biocycle.net/letter-editor-oregon-deq-packaging-lcas/

g. Perhaps most importantly, life cycle assessments generally do not account for impacts resulting from improper disposal of plastics[49] and resulting leakage into natural environments which causes some of the most visible and concerning impacts of plastics, including impacts on wildlife and aquatic environments, neighborhood blight, and the presence of plastics in water and food systems.

36. Moreover, any impacts will be offset because the Ordinance will reduce the generation of all types of waste from single-use food service ware by requiring full-service restaurants to use reusable food service ware for dine-in customers. In addition, the County's recent adoption of Ordinance No. 2021-0025 prohibiting food facilities from providing single-use food ware accessories to customers with prepared food except upon request will further reduce the generation of single-use food service ware waste.[50]

Markets for the Products of Compost and Anaerobic Digestion Facilities Are Expected to Expand, Which Will Make Composting and Anaerobic Digestion More Profitable; This Will Expand the Number of Facilities That Will Accept Single-Use Food Service Ware and Increase the Amount of Single-Use Food Service Ware that Can Be Composted or Anaerobically Digested

37. The Luskin Report notes that, currently, composting and anaerobic digestion facilities prefer food waste and green waste to compostable packaging materials, and local facilities do not accept compostable packaging, other than food-soiled paper products.[51]

38. CalRecycle's SB 1383 regulations requires all organic waste, including food service ware made from compostable, fiber-based materials, to be diverted from disposal and taken to a facility that processes organic waste, such as a composting or anaerobic digestion facility.[52] The expansion of collection programs that collect and divert organic waste will encourage the development of additional composting and anaerobic digestion facilities that can convert compostable, fiber-based single-use food service articles.[53] As discussed above in finding number 31 the new labeling requirements will also avoid both consumer and facility confusion, making it easier for local composting facilities to accept such compostable food service ware.

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[49] Vendries J, Hawkins T, Hottle T, Mosley J, Allaway D, Canepa P, Rivin J, Mistry M (2018). The Significance of Environmental Attributes as Indicators of the Life Cycle Environmental Impacts of Packaging and Food Service Ware. State of Oregon Department of Environmental Quality. Portland, Oregon, p. 21

[50]L.A. County Ord. No. 2021-0025, amending tit. 12, ch. 12.86 of the L.A. County Code <http://file.lacounty.gov/SDSInter/bos/supdocs/159047.pdf> [as of Mar. 31. 2022].

June 8, 2021, which can be found at http://file.lacounty.gov/SDSInter/bos/supdocs/159047.pdf.

[51] Luskin Report, *supra*, at p. 35; CalRecycle, SB 1383 Infrastructure and Market Analysis (April 2019), p. 26; see also CalRecycle, Model Mandatory Organic Waste Disposal Reduction Ordinance, p. 7 ("'Food Soiled Paper' is compostable paper material that has come in contact with food or liquid, such as, but not limited to, compostable paper plates, paper coffee cups, napkins, and milk cartons.")

[52] 14 Cal. Code Regs., § 18981.1 et seq.

[53] CalRecycle, SB 1383 Infrastructure and Market Analysis (April 2019), pp. 35, 86.

39. Moreover, the SB 1383 regulations also require counties and other local jurisdictions to purchase an amount of organic waste products, such as products from composting and anaerobic digestion, based upon the jurisdiction's population.[54] The purpose of these procurement requirements is to expand markets for the products of composting and anaerobic digestion to ensure that there is an end use for the recycled materials, which in turn will encourage the expansion of composting and anaerobic digestion facilities and increase diversion rates.[55] The state budget also allocates significant funds for strengthening the organic processing infrastructure.[56]

40. Therefore, to the extent that there is currently a shortfall in infrastructure that is available to compost and anaerobically digest compostable single-use plastic food ware, the Board finds that, in light of SB 1383 and other legislative actions designed to encourage development of infrastructure, the infrastructure will increase significantly to permit these items to be diverted from disposal in landfills.

41. In addition, the Ordinance will not result in an increase in vehicle miles traveled associated with transporting compostable food service ware to composting and other organic waste processing facilities, beyond what the SB 1383 regulations and the County's Organic Waste Disposal Reduction Ordinance, already require. The SB 1383 regulations requires the County, as of January 1, 2022, to collect organic waste from businesses and residents in the unincorporated area, and transport it to an organic waste processing facility for composting, anaerobic digestion, or other appropriate diversion from landfills.[57] It also requires jurisdictions to collect recyclable materials and transport it to an appropriate recycling facility. Consequently, such single use food service ware will simply be carried in a compost collection vehicle, rather than a trash collection vehicle.[58]

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[54] 14 Cal. Code Regs., § 18993.1.

[55] Final Statement of Reasons for CalRecycle's SB 1383 regulations, at 27-28; CalRecycle's January 2019 Initial Statement of Reasons for SB 1383 Regulations.

[56] https://www.gov.ca.gov/2021/10/05/governor-newsom-signs-legislation-to-tackle-plastic-pollution-promote-a-more-sustainable-renewable-economy-and-protect-californians-from-toxic-chemicals/

[57] 14 Cal. Code Regs., § 18984.1; Los Angeles County Code, ch. 20.91 <https://library.municode.com/ca/los_angeles_county/codes/code_of_ordinances?nodeId=TIT20UT_DIV4BORWAMA_CH20.91MAORWADIREOR> [as of Mar. 31, 2022].

[58] See *Friends of the Kings River v. Counts of Fresno* (Dec. 8, 2014, F068818). That case involved a new aggregate mine and related processing plant in the Sierra Nevada foothills. The Court of Appeal upheld the Air Quality and GHG analyses, which were based upon reducing absolute countywide VMT (i.e., displacing existing long-distance truck trips with shorter duration truck trips). See https://www.courts.ca.gov/opinions/archive/F068818.PDF. More specifically, the opinion noted:

Population growth correlates to growth in demand for aggregate and related construction materials…shortages in the Fresno area have resulted in rock being imported from Coalinga, a 60 mile haul, quoting a 2006 Department of Conservation report…

"Delivery trucks are an aspect of the Proposed Project that may result in a regional reduction of GHG emissions. By placing a source of aggregate, ready-mix concrete, and asphalt in a location where supply does not currently meet demand the Project will result in a reduction in VMT [vehicle miles traveled] for customers. It is expected that many of the Proposed Project's customers will be located within a 30 to 60-mile roundtrip distance from the Proposed Project. In the absence of the Proposed Project, a portion of these customers would otherwise have to travel to Coalinga to obtain these materials, at a roundtrip distance of approximately 120 miles. This reduction in distance traveled for customer vehicles would result in a corresponding reduction in GHG emissions…" (Emphasis added; Slip Opinion at pp. 54-57.)

42. In addition, the requirement in the Ordinance that full service restaurants use reusable food service ware for dine-in customers will reduce the total amount of single-use food service ware that is used, and the weight and volume of waste that is generated.[59]

CEQA Guidelines Sections 15307 and 15308

43. CEQA Guidelines Section 15307 provides an exemption for "actions taken by regulatory agencies as authorized by state law or local ordinance to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for protection of the environment. Examples include but are not limited to wildlife preservation activities of the State Department of Fish and Game. Construction activities are not included in this exemption."

44. CEQA Guidelines Section 15308 provides an exemption for "actions taken by regulatory agencies, as authorized by state or local ordinance, to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for protection of the environment. Construction activities and relaxation of standards allowing environmental degradation are not included in this exemption."

45. The Ordinance regulates the materials of single-use food service ware, and that will assure the maintenance, restoration or enhancement of a natural resource and the maintenance, restoration, enhancement or protection of the environment. Therefore Los Angeles County is considered a regulatory agency for the purposes of these exemptions. (*Save the Plastic Bag Coalition v. City and County of San Francisco* (2013) 222 Cal.App.4th 863, 876 ["when an ordinance, like San Francisco's Checkout Bag Ordinance, is enacted pursuant to the municipality's police powers to promote the general welfare, the municipality is acting in its regulatory capacity, within the meaning of CEQA's Class 7 and Class 8 Categorical Exemptions."].)

46. The Ordinance provides for the maintenance, restoration, enhancement or protection of the environment and natural resources by reducing the amount of single-use plastic food service ware and expanded polystyrene that enters the environment, local waterways and the ocean when it becomes litter, and that fills up landfills, as set forth in findings number 5 through 17.

47. The Board further finds that there is no reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances. As outlined in the findings above, there is no potential for the Ordinance to result in significant environmental impacts. Furthermore, unusual circumstances do not exist as there are currently over 100 local ordinances in California alone that restrict the use of single-use plastic food service ware and/or require single-use food service ware to either be compostable or recyclable, and that ban retail establishments from selling products made from expanded polystyrene.[60] For example:

[59] Luskin Report, *supra*, at p. 29.

[60] See, e.g.,

Alameda Mun. Code, ch. IV, art. I, § 4-4 <https://library.municode.com/ca/alameda/codes/code_of_ordinances?nodeId=CHIVOFPUSA_ARTILIMAPR_4-4DIFOSEWA> [as of Mar. 30, 2022];

Alameda County Code, tit. 6, ch. 6.118 <https://library.municode.com/ca/alameda_county/codes/code_of_ordinances?nodeId=TIT6HESA_CH6.118POFOSEWA> [as of Mar. 30, 2022];

Albany Mun. Code, ch. 8, § 8-20 <https://ecode360.com/34834791> [as of Mar. 30, 2022];

Alhambra Mun. Code, tit. VI, ch. 6.13 <https://codelibrary.amlegal.com/codes/alhambra/latest/alhambra_ca/0-0-0-114291> [as of Mar. 30, 2022];

Aliso Viejo Ord. No. 2004-060 <https://www.codepublishing.com/CA/AlisoViejo/ords/Ord%202004-060.pdf> [as of Mar. 30, 2022];

Arcata Mun. Code, tit. V, ch. 3.5, art. 3, § 5478.1 <https://www.codepublishing.com/CA/Arcata/#!/html/Arcata05/Arcata0503-5.html> [as of Mar. 30, 2022];

Arroyo Grande Ord. No. 676, adding tit. 8, ch. 8.34 to Arroyo Grande Mun. Code <https://www.arroyogrande.org/DocumentCenter/View/3008/Ordinance-676?bidId> [as of Mar. 30, 2022];

Atherton Mun. Code, tit. 8, ch. 8.56 <https://atherton.Mun..codes/Code/8.56.050> [as of Mar. 30, 2022];

Avalon Mun. Code, tit. 6, ch. 6-14 <https://ecode360.com/35897837> [as of Mar. 30, 2022];

Belmont City Code, ch. 31, art. II <https://library.municode.com/ca/belmont/codes/code_of_ordinances?nodeId=CICO_CH31WARE_ARTIIDIFOSEWA> [as of Mar. 30, 2022];

Berkeley Mun. Code, tit. 11, ch. 11.64 <https://berkeley.Mun..codes/BMC/11.64> [as of Mar. 30, 2022];

Beverly Hills Ord. No. 21-O-2848 https://codelibrary.amlegal.com/codes/beverlyhillsca/latest/beverlyhills_ca/0-0-0-26808 [as of Mar. 30, 2022];

Brisbane Mun. Code, tit. 8, ch. 8.19 <https://library.municode.com/ca/brisbane/codes/municipal_code?nodeId=TIT8HESA_CH8.19REUSDIFOSEWA> [as of Mar. 30, 2022];

Burlingame Mun. Code, tit. 8, ch. 8.10 <https://library.qcode.us/lib/burlingame_ca/pub/municipal_code/item/title_8-chapter_8_10?view=all> [as of Mar. 30, 2022];

Calabasas Mun. Code, tit. 8, ch. 8.18 <https://library.municode.com/ca/city_of_calabasas/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.18FOPAMA> [as of Mar. 30, 2022];

Campbell Mun. Code, tit. 6, ch. 6.30 <https://library.municode.com/ca/campbell/codes/code_of_ordinances?nodeId=TIT6HESA_CH6.30EXPO> [as of Mar. 30, 2022];

Capitola Mun. Code, tit. 8, ch. 8.07 <https://www.codepublishing.com/CA/Capitola/#!/Capitola08/Capitola0807.html> [as of Mar. 30, 2022];

Carmel-by-the-Sea Mun. Code, tit. 8, ch. 8.68 <https://www.codepublishing.com/CA/CarmelbytheSea/#!/Carmel08/Carmel0868.html> [as of Mar. 30, 2022];

Carpinteria Mun. Code, tit. 8, ch. 8.50 <https://library.municode.com/ca/carpinteria/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.50REEXPOFOCOPR> [as of Mar. 30, 2022];

Cloverdale Mun. Code, tit. 8, ch. 8.14 <https://www.codepublishing.com/CA/Cloverdale/#!/html/Cloverdale08/Cloverdale0814.html> [as of Mar. 30, 2022];

Colma Mun. Code, ch. 4, § 4.13 <https://www.colma.ca.gov/documents/cmc-4-13-disposable-polystyrene-food-service-ware/> [as of Mar. 30, 2022];

Concord Mun. Code, tit. 8, ch. 8.17 <https://www.codepublishing.com/CA/Concord/#!/html/Concord08/Concord0817.html> [as of Mar. 30, 2022];

Contra Costa County Code, tit. 4, div. 418, ch. 418-18 <https://library.municode.com/ca/contra_costa_county/codes/ordinance_code?nodeId=TIT4HESA_DIV418RE_CH418-18ENIEFOPA> [as of Mar. 30, 2022];

Cotati Mun. Code, tit. 8, ch. 8.20 <https://www.codepublishing.com/CA/Cotati/#!/html/Cotati08/Cotati0820.html> [as of Mar. 30, 2022];

Culver City Mun. Code, tit. 5, ch. 5.07, § 5.07.015 <https://codelibrary.amlegal.com/codes/culvercity/latest/culvercity_ca/0-0-0-78040#JD_5.07.015> [as of Mar. 30, 2022];

Cupertino Mun. Code, tit. 9, ch. 9.15 <https://codelibrary.amlegal.com/codes/cupertino/latest/cupertino_ca/0-0-0-84518> [as of Mar. 30, 2022];

Daly City Mun. Code, tit. 8, ch. 8.64 <https://library.municode.com/ca/daly_city/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.64PRUSPOSEDIFOSEWAFOVE> [as of Mar. 30, 2022];

Dana Point Mun. Code, tit. 6, ch. 6.46 <https://static1.squarespace.com/static/54d3a62be4b068e9347ca880/t/559ab387e4b069786e969cc1/1436201863766/DanaPoint+EPS+Ordinance.pdf> [as of Mar. 30, 2022];

Davis Mun. Code, ch. 32, art. 32.06 <https://qcode.us/codes/davis/?view=desktop&topic=32-32_06> [as of Mar. 30, 2022];

Del Mar Mun. Code, tit. 11, ch. 11.40 <https://library.municode.com/ca/del_mar/codes/municipal_code?nodeId=TIT11HESA_CH11.40USEXPONCYPLDIFOSEWA> [as of Mar. 30, 2022];

Del Rey Oaks Mun. Code, tit. 8, ch. 8.30 <https://library.municode.com/ca/del_rey_oaks/codes/municipal_code?nodeId=TIT8HESA_CH8.30POFOPA> [as of Mar. 30, 2022];

Dublin Mun. Code, tit. 5, ch. 5.34 <https://www.codepublishing.com/CA/Dublin/#!/html/Dublin05/Dublin0534.html> [as of Mar. 30, 2022];

El Cerrito Mun. Code, tit. 8, ch. 8.24 <https://library.municode.com/ca/el_cerrito/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.24FORE> [as of Mar. 30, 2022];

El Segundo Mun. Code, tit. 5, ch. 8 <https://codelibrary.amlegal.com/codes/elsegundoca/latest/elsegundo_ca/0-0-0-16614> [as of Mar. 30, 2022];

Emeryville Mun. Code, tit. 6, ch. 14 <https://www.codepublishing.com/CA/Emeryville/#!/Emeryville06/Emeryville0614.html> [as of Mar. 30, 2022];

Encinitas Mun. Code, tit. 11, ch. 11.27 <https://library.qcode.us/lib/encinitas_ca/pub/municipal_code/item/title_11-chapter_11_27?view=all> [as of Mar. 30, 2022]

Fairfax Mun. Code, tit. 8, ch. 8.16 <https://codelibrary.amlegal.com/codes/fairfax/latest/fairfax_ca/0-0-0-2486> [as of Mar. 30, 2022];

Fort Bragg Mun. Code, tit. 6, ch. 6.28 <https://www.codepublishing.com/CA/FortBragg/#!/FortBragg06/FortBragg0628.html#6.28> [as of Mar. 30, 2022];

Foster City Mun. Code, tit. 8, ch. 8.08 <https://www.codepublishing.com/CA/FosterCity/?FosterCity08/FosterCity0808.html> [as of Mar. 30, 2022];

Fremont Mun. Code, tit. 8, ch. 8.40, art. VIII <https://www.codepublishing.com/CA/Fremont/#!/Fremont08/Fremont0840.html#8.40> [as of Mar. 30, 2022];

Glendale Mun. Code, tit. 8, ch. 8.42 <https://library.qcode.us/lib/glendale_ca/pub/municipal_code/item/title_8-chapter_8_42?view=all> [as of Mar. 30, 2022];

Gonzales City Code, tit. 5, ch. 5.56 <https://www.codepublishing.com/CA/Gonzales/#!/Gonzales05/Gonzales0556.html#5.56> [as of Mar. 30, 2022];

Greenfield Mun. Code, tit. 8, ch. 8.54 <https://www.codepublishing.com/CA/Greenfield/#!/Greenfield08/Greenfield0854.html#8.54> [as of Mar. 30, 2022];

Grover Beach Mun. Code, art. V, ch. 7 <https://www.grover.org/DocumentCenter/View/178/GB_Art5?bidId=> [as of Mar. 30, 2022];

Half Moon Bay Mun. Code, tit. 7, ch. 7.30 <https://www.codepublishing.com/CA/HalfMoonBay/#!/HalfMoonBay07/HalfMoonBay0730.html#7.30> [as of Mar. 30, 2022];

Hayward Mun. Code, ch. 5, art. 11 <https://library.municode.com/ca/hayward/codes/municipal_code?nodeId=HAYWARD_MUNICIPAL_CODE_CH5SAHE_ART11POFODIFOSEWAPRRECOFOSEWARE> [as of Mar. 30, 2022];

Healdsburg Mun. Code, tit. 8, ch. 8.10 <https://www.codepublishing.com/CA/Healdsburg/#!/Healdsburg08/Healdsburg0810.html#8.10> [as of Mar. 30, 2022];

Hermosa Beach Mun. Code, tit. 8, ch. 8.64 <https://www.codepublishing.com/CA/HermosaBeach/#!/HermosaBeach08/HermosaBeach0864.html#8.64> [as of Mar. 30, 2022];

Highland Mun. Code, tit. 8, ch. 8.08 <https://www.codepublishing.com/CA/Highland/#!/Highland08/Highland0808.html#8.08> [as of Mar. 30, 2022];

Hillsborough Mun. Code, tit. 8, ch. 8.10 <https://library.municode.com/ca/hillsborough/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.10CHOCFOPA> [as of Mar. 30, 2022];

Huntington Beach Res. No. 2004-21 <https://www.huntingtonbeachca.gov/files/users/city_clerk/041904sm-rm.pdf> [as of Mar. 30, 2022];

Imperial Beach Mun. Code, tit. 16, ch. 16.16 <https://qcode.us/codes/imperialbeach/view.php?topic=16-16_16&showAll=1&frames=on> [as of Mar. 30, 2022];

Lafayette Mun. Code, tit. 5, ch. 5-8 <https://library.municode.com/ca/lafayette/codes/code_of_ordinances?nodeId=TIT5HESA_CH5-8FOPARE> [as of Mar. 30, 2022];

Laguna Beach Mun. Code, tit. 7, ch. 7.05 <http://www.qcode.us/codes/lagunabeach/view.php?topic=7-7_05&showAll=1&frames=on> [as of Mar. 30, 2022];

Laguna Woods Mun. Code, tit. 4, ch. 4.23 <https://library.municode.com/ca/laguna_woods/codes/code_of_ordinances?nodeId=TIT4HESA_CH4.23PRUSEXEXPOFOSEWA> [as of Mar. 30, 2022];

Livermore Mun. Code, tit. 8, ch. 8.20 <https://www.codepublishing.com/CA/Livermore/Municipal/Livermore08/Livermore0820.html#8.20> [as of Mar. 30, 2022];

Long Beach Mun. Code, tit. 8, ch. 8.63 <https://library.municode.com/ca/long_beach/codes/Mun._code?nodeId=TIT8HESA_CH8.63POFOPA> [as of Mar. 30, 2022];

Los Altos Mun. Code, tit. 6, ch. 6.44 <https://library.municode.com/ca/los_altos/codes/code_of_ordinances?nodeId=TIT6HESA_CH6.44POFODIFOSEWA> [as of Mar. 30, 2022];

Los Altos Hills Mun. Code, tit. 6, ch. 7 <https://qcode.us/codes/losaltoshills/view.php?topic=6-7&showAll=1&frames=on> [as of Mar. 30, 2022];

L.A. Mun. Code, ch. XIX, art. 3 <https://codelibrary.amlegal.com/codes/los_angeles/latest/lamc/0-0-0-321519> [as of Mar. 30, 2022];

Los Gatos Mun. Code, ch. 10, art. III <https://library.municode.com/ca/los_gatos/codes/code_of_ordinances?nodeId=CO_CH10FOFOES_ARTIIIEXPOFOFOSECORE> [as of Mar. 30, 2022];

Malibu Mun. Code, tit. 9, ch. 9.24 <https://static1.squarespace.com/static/54d3a62be4b068e9347ca880/t/583e170cf7e0ab6135335714/1480464140988/Staff+Report+%26+Ordinance+11_28_16.PDF> [as of Mar. 30, 2022];

Manhattan Beach Mun. Code, tit. 5, ch. 5.80 <https://static1.squarespace.com/static/54d3a62be4b068e9347ca880/t/5617f23ae4b0bf23ad81db48/1444409914079/MB+Polystyrene+ordinance+-+Sept+2013+final.pdf> [as of Mar. 30, 2022];

Marin County Code, tit. 7, ch. 7.25 <https://library.municode.com/ca/marin_county/codes/municipal_code?nodeId=TIT7HESA_CH7.25REDI> [as of Mar. 30, 2022];

Marina Mun. Code, tit. 8, ch. 8.50 <https://marina.municipal.codes/Code/8.50> [as of Mar. 30, 2022];

Martinez Mun. Code, tit. 8, ch. 8.18, § 8.18.320 <https://library.municode.com/ca/martinez/codes/code_of_ordinances?nodeId=CD_ORD_TIT8HESA_CH8.18SORERE_8.18.320PRFOPA> [as of Mar. 30, 2022];

Mendocino County Code, tit. 9, ch. 9.42 <https://library.municode.com/ca/mendocino_county/codes/code_of_ordinances?nodeId=MECOCO_TIT9HESA_CH9.42DIFOWA> [as of Mar. 30, 2022];

Menlo Park Mun. Code, tit. 7, ch. 7.14 <https://www.codepublishing.com/CA/MenloPark/#!/MenloPark07/MenloPark0714.html#7.14> [as of Mar. 30, 2022];

Millbrae Mun. Code, tit. 6, ch. 6.40 <https://www.codepublishing.com/CA/Millbrae/#!/Millbrae06/Millbrae0640.html#6.40> [as of Mar. 30, 2022];

Mill Valley Mun. Code, tit. 7, ch. 7.30 <https://qcode.us/codes/millvalley/view.php?topic=7-7_30&showAll=1&frames=on> [as of Mar. 30, 2022];

Milpitas Mun. Code, tit. III, ch. 8 <https://library.municode.com/ca/milpitas/codes/code_of_ordinances?nodeId=TITIIIBUPR_CH8PREXPOEPFOFOSEWA> [as of Mar. 30, 2022];

Monterey City Code, ch. 14, art. 3 <https://monterey.municipal.codes/Code/14-16> [as of Mar. 30, 2022];

Monterey County Code, tit. 10, ch. 10.42 <https://library.municode.com/ca/monterey_county/codes/code_of_ordinances?nodeId=TIT10HESA_CH10.42REUSPOFOFOPAFOPR> [as of Mar. 30, 2022];

Morgan Hill Mun. Code, tit. 8, ch. 8.56 <https://library.municode.com/ca/morgan_hill/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.56ENACFOCOSEWA> [as of Mar. 30, 2022];

Mountain View City Code, ch. 16, art. V <https://library.municode.com/ca/mountain_view/codes/code_of_ordinances?nodeId=PTIITHCO_CH16GARUWE_ARTVUSPOFOFOSEWAFOPR> [as of Mar. 30, 2022];

Newport Beach Mun. Code, tit. 6, ch. 6.05 <https://www.codepublishing.com/CA/NewportBeach/#!/NewportBeach06/NewportBeach0605.html#6.05> [as of Mar. 30, 2022];

Novato Mun. Code, ch. VII, § 7-6 <https://library.municode.com/ca/novato/codes/code_of_ordinances?nodeId=CHVIIHE_7-6PRUSPOFODIFOPA> [as of Mar. 30, 2022];

Oakland Mun. Code, tit. 8, ch. 8.07 <https://library.municode.com/ca/oakland/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.07DIFOSEWA> [as of Mar. 30, 2022];

Ojai Mun. Code, tit. 5, ch. 14 <http://www.qcode.us/codes/ojai/view.php?topic=5-14&showAll=1&frames=on> [as of Mar. 30, 2022];

Pacific Grove Mun. Code, tit. 11, ch. 11.98 <https://www.codepublishing.com/CA/PacificGrove/#!/html/PacificGrove11/PacificGrove1198.html> [as of Mar. 30, 2022];

Pacifica Mun. Code, tit. 6 ch. 5, art. 4 <https://library.municode.com/ca/pacifica/codes/code_of_ordinances?nodeId=TIT6SAHE_CH5GACORE_ART4SUFOSEWAPRPLPR> [as of Mar. 30, 2022];

Palo Alto Mun. Code, ch. 5.35 <https://static1.squarespace.com/static/54d3a62be4b068e9347ca880/t/5581f603e4b05b2c1b5d42b7/1434580483293/Palo+Alto.pdf> [as of Mar. 30, 2022];

Pasadena Mun. Code, ch. 8.65 <https://static1.squarespace.com/static/54d3a62be4b068e9347ca880/t/5581f615e4b05b2c1b5d432e/1434580501674/Pasadena.pdf> [as of Mar. 30, 2022];

Paso Robles Mun. Code, tit. 5, ch. 5.30 <https://codelibrary.amlegal.com/codes/paloalto/latest/paloalto_ca/0-0-0-65230> [as of Mar. 30, 2022];

Petaluma Mun. Code, tit. 8, ch. 8.17 <https://petaluma.municipal.codes/Code/8.17> [as of Mar. 30, 2022];

Pinole Mun. Code, ch. 8.37 <https://p1cdn4static.civiclive.com/UserFiles/Servers/Server_10946972/File/City%20Government/City%20Clerk/Archived%20Agenda/Archived%20City%20Council/2018%20Agendas/03-20-2018/07C.pdf> [as of Mar. 30, 2022];

Sacramento City Code, tit. 5, ch. 5.154 <https://www.qcode.us/codes/sacramento/view.php?topic=5-5_154&showAll=1&frames=on> [as of Mar. 30, 2022];

Sacramento County Code, tit. 6, ch. 6.130 <https://qcode.us/codes/sacramentocounty/view.php?topic=6-6_130&showAll=1&frames=on> [as of Mar. 30, 2022];

San Diego Mun. Code, ch. 6, art. 6, div. 9 <https://docs.sandiego.gov/municode/MuniCodeChapter06/Ch06Art06Division09.pdf> [as of Mar. 30, 2022];

S.F. Environment Code, ch. 16 <https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_environment/0-0-0-1426> [as of Mar. 30, 2022];

San Jose Mun. Code, tit. 9, ch. 9.10, pt. 17 <https://library.municode.com/ca/san_jose/codes/code_of_ordinances?nodeId=TIT9HESA_CH9.10SOWAMA_PT17POFODIFOSEWA> [as of Mar. 30, 2022];

San Luis Obispo Mun. Code, tit. 8, ch. 8.06 <https://sanluisobispo.Mun..codes/Code/8.06> [as of Mar. 30, 2022];

San Mateo Mun. Code, tit. 5, ch. 5.89 <https://sanmateo.ca.us.open.law/us/ca/cities/san-mateo/code/5.89> [as of Mar. 30, 2022];

San Mateo County Code, tit. 4, ch. 4.107 <https://library.municode.com/ca/san_mateo_county/codes/code_of_ordinances?nodeId=TIT4SAHE_CH4.107REUSDIFOSEWA> [as of Mar. 30, 2022];

Santa Barbara Mun. Code, tit. 9, ch. 9.160 <http://qcode.us/codes/santabarbara/?view=desktop&topic=9-9_160-9_160_080> [as of Mar. 30, 2022];

Santa Clara County Code, tit. B, div. B11, ch. XIX <https://library.municode.com/ca/santa_clara_county/codes/code_of_ordinances?nodeId=TITBRE_DIVB11ENHE_CHXIXEXPORE> [as of Mar. 30, 2022];

Santa Cruz Mun. Code, tit. 6, ch. 6.48 <https://www.codepublishing.com/CA/SantaCruz/#!/SantaCruz06/SantaCruz0648.html#6.48> [as of Mar. 30, 2022];

Santa Cruz County Code, tit. 5, ch. 5.46 <https://www.codepublishing.com/CA/SantaCruzCounty/#!/SantaCruzCounty05/SantaCruzCounty0546.html#5.46> [as of Mar. 30, 2022];

Santa Monica Mun. Code, art. 5, ch. 5.44 <http://www.qcode.us/codes/santamonica/view.php?topic=5-5_44&showAll=1&frames=on> [as of Mar. 30, 2022];

Sonoma Mun. Code, tit. 7, ch. 7.30 <https://www.codepublishing.com/CA/Sonoma/#!/Sonoma07/Sonoma0730.html#7.30> [as of Mar. 30, 2022];

Sonoma County Code, ch. 19, art. VI <https://library.municode.com/ca/sonoma_county/codes/code_of_ordinances?nodeId=CH19OFIS_ARTVIPOPEPOSUPRUSS> [as of Mar. 30, 2022];

South Pasadena City Code, ch. 16, art. IV <https://www.codepublishing.com/CA/SouthPasadena/#!/SouthPasadena16.html#16> [as of Mar. 30 2022];

San Buenaventura Mun. Code, div. 8, ch. 8.030 <https://library.municode.com/ca/san_buenaventura/codes/code_of_ordinances?nodeId=DIV8PUHESARE_CH8.030REEXPOFOCO> [as of Mar. 30, 2022];

- City of San Francisco: prohibits the use of polystyrene foam disposable food service ware and requires the use of biodegradable/compostable or recyclable disposable food service ware by restaurants and certain other food vendors.[61] Studies showed that in the three year period after the passage of the ordinance, there was a 41% decrease in polystyrene litter within the City.[62]

- Berkeley: requires single use food service ware to be compostable and free from all intentionally added fluorinated chemicals.[63]

- Long Beach: requires disposable food service ware to be recyclable or compostable, and prohibits all polystyrene food service ware and packaging.[64]

- Oakland: prohibits food vendors from providing prepared food to customers in disposable food service ware made from polystyrene and requires vendors using disposable food service ware to use food service ware that is compostable or biodegradable.[65]

- Santa Monica: prohibits food and beverage providers from providing prepared food or beverages with disposable food service ware unless it is "marine degradable."[66]

- Culver City: bans the use or sale of polystyrene food service ware and the sale of polystyrene coolers and packaging, and requires all disposable food service ware provided with take-out and delivery orders to be acceptable to the City's organics collection program.[67]

- Malibu: prohibits food vendors from providing prepared food in food service ware that is either made of polystyrene foam, or that is not compostable or recyclable, and

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Ventura County Code, div. 6, ch. 4, art. 6, § 6406-12 <https://library.municode.com/ca/ventura_county/codes/code_of_ordinances?nodeId=DIV6PORE_CH4VECOHAOR_ART6GERE_6406-12PRUSDIEXPOFOSEPR> [as of Mar. 30, 2022];

West Hollywood Mun. Code, tit. 15, art. 3, ch. 15.60 <http://qcode.us/codes/westhollywood/view.php?topic=15-3-15_60&showAll=1&frames=on> [as of Mar. 30, 2022].

[61] Chapter 16 of the San Francisco Environment Code, Food Service and Packaging Waste Reduction Ordinance:.https://codelibrary.amlegal.com/codes/san_francisco/latest/sf_environment/0-0-0-1426

[62] https://scholarworks.sjsu.edu/cgi/viewcontent.cgi?referer=https://scholar.google.com/&httpsredir=1&article=1265&context=etd_projects at 33

[63] Chapter 11.64 of the Berkeley Municipal Code, Single Use Foodware and Litter Reduction, //berkeley.municipal.codes/BMC/11.64

[64] Long Beach Municipal Code, Chapter 8.63-Polystyrene Food Packaging, https://library.municode.com/ca/long_beach/codes/municipal_code?nodeId=TIT8HESA_CH8.63POFOPA

[65] Oakland Municipal Code, Chapter 8.07-Disposable Food Service Ware, https://library.municode.com/ca/oakland/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.07DIFOSEWA..

[66] Santa Monica Municipal Code, Chapter 5.44-Non Marine Degradable Disposable Food Service Ware, http://www.qcode.us/codes/santamonica.

[67] Culver City Municipal Code, Chapter 5.07-Waste Reduction Regulations, https://codelibrary.amlegal.com/codes/culvercity/latest/culvercity_ca/0-0-0-78040#JD_5.07.015.

also prohibits the sale of various types of products made from polystyrene foam, including coolers, beach toys, and packing materials.[68]

- Alameda County: prohibits food providers from using disposable food service ware or disposable packaging made from polystyrene and requires disposable food service ware to be recyclable or biodegradable.[69]

- Santa Barbara: prohibits food providers from using disposable food service ware or disposable packaging made from polystyrene and requires disposable food service ware to be recyclable or biodegradable, and prohibits vendors from selling products made from expanded polystyrene.[70]

- San Luis Obispo: prohibits food providers from using disposable food containers made from expanded polystyrene with prepared food, and prohibits vendors from selling products made from expanded polystyrene.[71]

- Manhattan Beach: bans food service ware, packaging materials and coolers made from polystyrene.[72]

- Calabasas: prohibits food establishments and non-profit food providers from providing food or beverages to customers that is placed, wrapped or packaged in or on material that is not recyclable, biodegradable, degradable or returnable, or that is made from expanded polystyrene.[73]

48. In addition to local regulations of single-use plastic food service ware, in 2018, the California State Legislature adopted SB 1335, known as the Sustainable Packaging for the State of California Act of 2018. This law prohibits food service facilities located in a state-owned facility, operating on or acting as a concessionaire on state property, or under contract to provide food service to a state agency from dispensing prepared food using food service packaging unless it is reusable, recyclable, or compostable.

49. The County has received written comments regarding the Ordinance, including comments in support of the Ordinance, as well as comments that oppose some or all of the Ordinance. For example, the American Chemistry Council, the California Restaurant Association, the California and Los Angeles Chambers of Commerce, Dart Container,

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[68] Malibu Municipal Code, Chapter 9.24- Ban on Plastic Food Packaging and Other Plasticware, https://qcode.us/codes/malibu.

[69] Alameda County Municipal Code, Chapter 6.118-Polystyrene Food Service Ware, https://library.municode.com/ca/alameda_county/codes/code_of_ordinances?nodeId=TIT6HESA_CH6.118POFOSEWA.

[70] Santa Barbara Municipal Code, Chapter 9.160-Expanded Polystyrene Food Containers and Products, https://www.santabarbaraca.gov/civicax/filebank/blobdload.aspx?BlobID=213793.

[71] San Luis Obispo Municipal Code, Chapter 8.06-Expanded Polystyrene, https://sanluisobispo.municipal.codes/Code/8.06.

[72] Manhattan Beach Municipal Code, Chapter 5.80-Environmental Regulations, https://library.municode.com/ca/manhattan_beach/codes/code_of_ordinances?nodeId=TIT5SAHE_CH5.80ENRE_5.80.040PRUSDISAPOFOSEWACOPAMAEGCAPRMETR.

[73] Calabasas Municipal Code, Chapter 8.18-Food Packaging Materials, https://library.municode.com/ca/city_of_calabasas/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.18FOPAMA.

and the Los Angeles County Business Federation submitted comments critical of the Ordinance. The County has prepared responses to these written comments, which are included in the package that has been submitted to the Board of Supervisors with the Ordinance.

50. On March 15, 2022, the County had a meeting with representatives of the American Chemistry Council to discuss their concerns with the proposed Ordinance provisions and a comment letter that they had previously provided on the proposed provisions. During this meeting, the American Chemistry Council indicated that they would provide an additional comment letter summarizing their concerns raised during the meeting, which included their proposition that compostable single-use materials could have greater environmental impacts than plastic single-use materials, as well as documentation supporting this argument. However, as of March 31, 2022, no such documentation has been provided for the County's review.

51. The Board further finds that there is no potential for cumulative impacts from successive projects of the same type in the same place over time. As discussed in finding number 36, the Ordinance, as well as an ordinance adopted by the County in 2021 banning food facilities from providing single-use accessories to customers except upon request, will reduce the overall usage of single-use food service ware.

52. The Board further finds that this ordinance is a programmatic regulation which is not specific to any parcel, and therefore is not on any list compiled pursuant to Government Code Section 65962.5, and does not have the potential to result in significant impacts to scenic highways.