States of California, Colorado, Connecticut, Delaware, Maryland, Michigan, Minnesota, New Jersey, New York, Oregon, and Vermont
Commonwealths of Massachusetts and Pennsylvania; and District of Columbia

July 31, 2023

Via electronic submission to www.regulations.gov

Director Carolyn Hoskinson
Office of Resource Conservation and Recovery
Environmental Protection Agency
1200 Pennsylvania NW
Washington, DC 20004

Re: Draft National Strategy to Prevent Plastic Pollution: Request for Public Comment (Docket No. EPA-HQ-OLEM-2023-0228; 88 FR 27502 (May 2, 2023))

Dear Director Hoskinson:

The Attorneys General of California,[1] Colorado, Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Oregon, Pennsylvania, Vermont (collectively "States") respectfully submit these comments in connection with the Environmental Protection Agency's ("EPA") Draft National Strategy to Prevent Plastic Pollution ("Draft Strategy").

The plastic pollution crisis is one of the most pervasive challenges of our time—inexorably intersecting with global threats such as climate change and biodiversity loss. And perhaps unsurprisingly, the impacts of this crisis are not felt equally. We, the States, are deeply concerned about the harms suffered by our residents living in communities near plastic-making infrastructure including fossil fuel extraction sites, refineries, and plastic and chemical manufacturing plants. Such communities are often impoverished communities of color and disproportionately bear the brunt of the plastic pollution crisis—breathing in the worst air, drinking the worst water, and tragically, developing cancer at higher rates. As the world grapples with the magnitude of the plastic pollution crisis, the United States has an opportunity to lead on implementing workable solutions that will not only mitigate the worst impacts of the crisis, but transform our unsustainable take-make-waste economy into a more equitable circular economy. But we must act now, and our response must match the urgency of the crisis.

[1] The California Attorney General submits these comments in his independent capacity on behalf of the People of the State of California, and with support from the California Coastal Commission, California Department of Parks and Recreation, California Department of Public Health, California Department of Resources Recycling and Recovery, California Department of Toxic Substances Control's Safer Consumer Products Program, California Ocean Protection Council, California State Lands Commission, and California State Water Resources Control Board.

Pursuant to the Save Our Seas 2.0 Act, in 2022 the National Academies of Science, Engineering, and Medicine released a consensus report entitled, "Reckoning with the U.S. Role in Global Ocean Plastic Waste" ("2022 National Academies Report"), which calls for a national strategy to reduce the nation's contribution to global ocean plastic waste at every step—from its production to its entry into the environment—including by substantially reducing U.S. solid waste generation (both in absolute terms and per person).[2] The plastic waste life cycle includes six stages: (1) production, (2) materials and product design, (3) waste generation, (4) waste management, (5) plastic waste in the environment, and (6) plastic waste in the ocean.[3] EPA's Draft Strategy, however, primarily focuses only on Stages 3, 4, and 5.

We urge EPA to meet the call of the 2022 National Academies Report by adopting a more comprehensive strategy that implements aggressive interventions at *every* stage of the plastic waste life cycle. EPA's actions to address plastic pollution across the plastic waste life cycle should be guided by the precautionary principle that "urges action against environmental threats even in the face of scientific uncertainties."[4] We are mindful that there are limits to what EPA can accomplish without further Congressional approval. However, EPA should use all available authority to act, and should affirmatively identify and highlight in its Final Strategy those areas in which Congressional intervention is necessary to address fully the plastic pollution crisis.

STAGE 1:
PRODUCTION

EPA seeks feedback on which actions would have the greatest positive impact, while protecting human health, environmental quality, and advancing environmental justice and climate objectives.[5] Decisive actions to dramatically reduce plastic production, in addition to implementing a suite of interventions across the remainder of the plastic waste life cycle, are necessary to achieve those objectives. Ignoring the first stage of the life cycle will jeopardize the effectiveness of any plastic pollution strategy.[6]

I. EPA's Strategy Must Include Goals and Actions to Reduce Virgin Plastic Production, Including a Clear and Comprehensive Plastic Source Reduction Requirement.

Global plastic production has skyrocketed in recent years, increasing from 20 million metric tons in 1966 to 381 million metric tons in 2015.[7] Unsurprisingly, plastic waste generation has risen in lock-step with production, with the United States being the largest generator of plastic

[2] NAT'L ACADS. SCIS., ENG'G, AND MED., RECKONING WITH THE U.S. ROLE IN GLOBAL OCEAN PLASTIC WASTE 72 (2022).
[3] *Id*. at 143.
[4] DANIEL BODANSKY, THE ART AND CRAFT OF INTERNATIONAL ENVIRONMENTAL LAW 32 (2010).
[5] U.S. EPA, DRAFT NAT'L STRATEGY TO PREVENT PLASTIC POLLUTION 3 (2023) [hereinafter DRAFT STRATEGY], https://www.epa.gov/system/files/documents/2023-04/Draft_National_Strategy_to_Prevent_Plastic_Pollution.pdf.
[6] NAT'L ACADS., *supra* note 2, at 146.
[7] *Id*. at 2.

waste.[8] Based on 2016 estimates, U.S. plastic waste escapes ("leaks") into the environment at a rate of 1.13 to 2.24 million metric tons per year.[9] Unfortunately, plastic production is not slowing down. In recent years, the plastics industry has invested hundreds of billions of dollars to expand petrochemical capacity to produce even *more* plastic.[10]

Despite its role in causing the plastic pollution crisis, however, the U.S. response has historically been focused on cleanup and local waste management, which evidently has not been enough to prevent plastic pollution from occurring.[11] For decades, the national plastic waste strategy has been to improve recycling. But this recycling-centric strategy has proven insufficient. As the 2022 National Academies Report concluded, "today's recycling processes and infrastructure are grossly insufficient to manage the diversity, complexity, and quantity of plastic waste in the United States."[12] Indeed, we recycled only about 9 percent of plastic in 2018, which was sadly our highest recycling rate ever.[13] We now recycle even less plastic—just 5 to 6 percent per year.[14]

The Draft Strategy acknowledges that "we need more upstream solutions to addressing plastic pollution."[15] However, the Draft Strategy does not at all address the need to reduce virgin plastic production (the most upstream stage in the life cycle), and instead focuses on actions to reduce plastic waste and improve management. Reducing virgin and overall plastic production decreases the need for waste management and prevents the overall leakage of plastics into the environment.[16] While plastic recycling can play a role in EPA's Strategy, the main focus should be dramatically reducing virgin and overall plastic production.[17]

Additionally, it is especially crucial to confront plastic waste throughout each stage of its life cycle, as upstream stages have particularly disproportionate impacts on environmental justice

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[8] See *id*. at 3.
[9] *Id*. at 5.
[10] Scott Carpenter, *Why The Oil Industry's $400 Billion Bet On Plastics Could Backfire*, FORBES (Sep. 5, 2020), https://www.forbes.com/sites/scottcarpenter/2020/09/05/why-the-oil-industrys-400-billion-bet-on-plastics-could-backfire/?sh=485f987e43fe; *see, e.g., ExxonMobil announces $2 billion Baytown chemical expansion project; releases study showing value of investments to U.S. Economy,* EXXONMOBIL (May 2, 2019), https://corporate.exxonmobil.com/news/news-releases/2019/0502_exxonmobil-announces-2-billion-baytown-chemical-expansion-project.
[11] NAT'L ACADS., *supra* note 2, at 155.
[12] *Id*. at 6.
[13] *Facts and Figures about Materials, Waste and Recycling, Plastics: Material-Specific Data*, U.S. EPA, https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data (last visited May 22, 2023) (8.7 percent plastic recycling rate in 2018).
[14] BEYOND PLASTICS & THE LAST BEACH CLEANUP, THE REAL TRUTH ABOUT THE U.S. PLASTICS RECYCLING RATE 2 (May 2022), https://bit.ly/US-plastics-recycling-rate.
[15] DRAFT STRATEGY, *supra* note 5, at 13.
[16] NAT'L ACADS., *supra* note 2, at 144.
[17] Stephanie B. Borelle et al., *Predicted growth in plastic waste exceeds efforts to mitigate plastic pollution*, 369 SCIENCE 1515, 1517 (2020); Winnie W.Y. Lau et al., *Evaluating scenarios toward zero plastic pollution*, SCIENCE 1455, 1455 (2020); THE PEW CHARITABLE TRUSTS ET AL., BREAKING THE PLASTIC WAVE 34 (2020) ("Although scaling up recycling is critically needed, our study finds that stopping plastic pollution by capturing all plastic materials in the recycling process is neither technically nor financially feasible.").

communities.[18] At the very outset of the plastic production process, extraction of natural gas and crude oil to produce virgin plastic results in air pollution and greater risk of water pollution, as well as health impacts such as elevated cancer risks, adverse birth outcomes, and asthma exacerbation.[19] These impacts are disproportionately felt by communities that have environmental justice concerns.[20] The fuels are then transported, refined, and processed in facilities causing more dire environmental and potential health impacts, frequently in communities with less political recognition and less economic means to relocate.[21] For example, in the Houston area, which has more than 600 chemical manufacturing facilities and accounts for 44 percent of the nation's base petrochemical capacity,[22] neighborhoods with a higher percentage of non-White populations and higher income inequality bear the brunt of significantly greater exposure to chronic risks from air pollution and potential chemical facility accidents.[23] In a 130-mile corridor along the Mississippi River, long-identified as "Cancer Alley," and home to more than 200 industrial facilities, including plastics plants, toxic air pollution is directly linked to higher cancer incidence, with Black and impoverished tracts being disproportionately impacted.[24]

Executive Order 14008 commits the Biden Administration "to secure environmental justice and spur economic activity for disadvantaged communities that have been historically marginalized and overburdened by pollution and under-investment in housing, transportation, water and wastewater infrastructure, and health care." Accordingly, it is essential for the EPA's Strategy to focus on addressing upstream stages in the plastics life cycle, *i.e.*, plastic production which releases air toxics and other environmental harms in the vicinity of environmental justice communities.

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[18] Environmental justice is defined by EPA as the "fair treatment and meaningful involvement of all people regardless of race, color, national origin or income with respect to development, implementation, and enforcement of environmental laws, regulations and policies." EPA, EPA-300-B-1-6004, EJ 2020 Action Agenda: The U.S. EPA's Environmental Justice Strategic Plan for 2016-2020, at 1 (Oct. 2016). For the purpose of this comment, the term "environmental justice community" refers to a community of color or community experiencing high rates of poverty that due to past and or current unfair and inequitable treatment is overburdened by environmental pollution, and the accompanying harms and risks from exposure to that pollution, because of past or current unfair treatment.

[19] Timothy Q. Donaghy, et al., *Fossil fuel racism in the United States: How phasing out coal, oil, and gas can protect communities*, 100 ENERGY RESEARCH & SOCIAL SCIENCE 103104 (June 2023) 6.

[20] *Id.* ("In California, people living closer to oil and gas wells are disproportionately from low-income households with non-white and Latinx demographics.")

[21] UNEP, NEGLECTED: ENVIRONMENTAL JUSTICE IMPACTS OF MARINE LITTER AND PLASTIC POLLUTION 17, 25 (2021).

[22] *Chemical Industry Overview,* GREATER HOUSTON PARTNERSHIP (Apr. 26, 2021), https://www.houston.org/houston-data/chemical-industry-overview.

[23] UNION OF CONCERNED SCIENTISTS & TEXAS ENVIRONMENTAL JUSTICE ADVOCACY SERVICES, DOUBLE JEOPARDY IN HOUSTON: ACUTE AND CHRONIC CHEMICAL EXPOSURES POSE DISPROPORTIONATE RISKS FOR MARGINALIZED COMMUNITIES 3, 13–15 (Oct. 2016).

[24] Kimberly A. Terrell & Gianna St. Julien, *Air Pollution is linked to higher cancer rates among black or impoverished communities in Louisiana,* 17 ENV'T RSCH. LETTERS 1, 10–12 (2022).

The 2022 National Academies Report calls for a national strategy to reduce the nation's contribution to global ocean plastic waste at every step—from production to its entry into the environment—including by substantially reducing U.S. solid waste generation (absolute and per person).[25] The report identified three types of interventions that can effectively reduce virgin plastic production: (1) setting national targets to cap or reduce virgin plastic production, (2) requiring reductions in plastic production (as carbon equivalents) as part of global, U.S., and state greenhouse gas emissions targets, and (3) declaring a moratorium on new petrochemical plants and expanding capacity of such facilities.[26]

EPA should evaluate its existing authorities to determine whether any of the three interventions set forth above can be accomplished without additional Congressional approval. This includes setting a clear, comprehensive plastic source reduction requirement—rather than an unspecified voluntary goal (Sub-objective A1.5)—with an identified timeline and milestones to reduce plastic production and single-use plastic products, as well as creating incentives to accelerate voluntary production reduction. If, however, Congressional approval is necessary, EPA should transparently study the efficacy of these interventions alongside stakeholders including the States, then work with Congress to identify the necessary statutory changes in federal law to appropriately advance a reduction requirement.

Additionally, under its various permitting authorities, EPA must thoroughly consider all impacts on the environment and human health before authorizing the development or expansion of any petrochemical facility that manufactures plastic or processes plastic waste into fuel, petrochemical feedstock, waxes, or other chemicals.[27] EPA must particularly ensure that communities neighboring the proposed site of any such development or expansion are protected

[25] NAT'L ACADS., *supra* note 2, at 72 ("Recommendation 1. The United States should substantially reduce solid waste generation (absolute and per person) to reduce plastic waste in the environment and the environmental, economic, aesthetic, and health costs of managing waste and litter.").
[26] *Id*. at 158.
[27] *See, e.g.,* Toxic Substances Control Act, 15 U.S.C. § 2604 (requiring the Administrator to consider whether the use of a chemical substance is a significant new use that alters exposure to humans or the environment, determine whether the use presents an unreasonable risk of injury to health or the environment, and if so, take certain steps to protect the public from those unreasonable risks); Clean Water Act, 33 U.S.C. § 1312(a) (authorizing the Administrator to establish effluent limitations for point sources or groups of point sources that would interfere with water quality in navigable waters to protect public health); Clean Air Act, 42 U.S.C. § 7609 (requiring the Administrator review and comment in writing on the environmental impact of any matter relating to their authorized duties and responsibilities); Resource Conservation and Recovery Act, 42 U.S.C. §§ 6934(a) (authorizing the Administrator to issue an order requiring a facility owner or operator to conduct certain tasks if they determine the presence of any hazardous waste facility or site or the release of such waste may present a substantial hazard to human health or the environment), 6981(a)(1) (authorizing the Administrator to encourage or render financial and other assistance to public entities to conduct work related to the adverse health and welfare effects related to the release of solid waste and methods to eliminate such effects); Pollution Prevention Act, 42 U.S.C. § 13107(a) (requiring the Administrator to provide Congress with biennial reports detailing actions taken to promote source reduction, results of those actions, assess effectiveness of the clearinghouse and grant program, and evaluate data gaps and duplication); National Environmental Policy Act, 42 U.S.C. § 4336 (requiring agencies to prepare environmental review documents for proposed agency actions).

from any potential and actual pollution associated with the development or expansion.[28] EPA must also consider the cumulative environmental and human health impacts of approving any petrochemical development or expansion.[29] Several executive orders require or authorize federal agencies to secure environmental justice by considering such cumulative impacts.[30]

II. EPA Should Increase Public Access to Information about Plastic Sector Facilities to Promote Compliance, Accountability, and Transparency.

The States support Sub-objective A2.4, which requires evaluations to ensure that production facilities within the plastic sector comply with federal, state, tribal, and local regulations.[31] The States also support Sub-objective A2.5, which requires the mapping of existing and proposed plastic production facilities to evaluate their environmental justice and public health impacts on neighboring communities.[32]

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[28] *See generally* U.S. EPA OFF. GEN. COUNS., EPA LEGAL TOOLS TO ADVANCE ENVIRONMENTAL JUSTICE (May 2022), https://www.epa.gov/system/files/documents/2022-05/EJ%20Legal%20Tools%20May%202022%20FINAL.pdf; *see also* 40 C.F.R. pt. 25 (2023) (discussing public participation under RCRA, CWA, and the Safe Drinking Water Act).

[29] 32 C.F.R. § 651.16 (2023) (requiring NEPA analyses assessing cumulative effects of proposed projects); 42 U.S.C. § 7475(a)(3) (requiring the owner or operator of an emitting facility not to contribute to air pollution in excess of maximum allowable increase or concentration, national ambient air quality standards, or any other applicable standards); In Re: Chemical Waste Management of Indiana, Inc. Permittee, 6 E.A.D. 66 (EAB 1995) (concluding EPA has the authority to take into account cumulative impacts when permitting projects under RCRA based on disproportionately high and adverse health or environmental effects on low-income or minority populations); *see generally* U.S. EPA OFF. GEN. COUNS., EPA LEGAL TOOLS TO ADVANCE ENVIRONMENTAL JUSTICE ADDENDUM (Jan. 2023), https://www.epa.gov/system/files/documents/2022-12/bh508-Cumulative%20Impacts%20Addendum%20Final%202022-11-28.pdf.

[30] Exec. Order No. 13,985, 86 Fed. Reg. 7009 (Jan. 25, 2021) (directing all federal agencies to "work to redress inequities in their policies and programs that serve as barriers to equal opportunity"); Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021) (directing federal agencies to "secure environmental justice and spur economic opportunity for disadvantaged communities that have been historically marginalized and overburdened by pollution and underinvestment" and "to address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities"); Exec. Order No. 13,990, 86 Fed. Reg. 7037 (Jan. 25, 2021) (directing all executive departments and agencies to address any actions that conflict with goals of reducing greenhouse gas emissions and prioritizing environmental justice, among other national objectives); Exec. Order No. 13,563, 76 Fed. Reg. 3821 (Jan. 21, 2011) (directing agencies to select regulatory approaches that maximize net benefits including "distributive impacts[] and equity"; "Where appropriate and permitted by law, each agency may consider (and discuss qualitatively) values that are difficult or impossible to quantify, including equity . . . and distributive impacts."); Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 16, 1994) (directing each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations," including "consider[ing] (and discuss[ing] qualitatively) values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts" and "multiple and cumulative exposures"); Exec. Order No. 12,866, 51 Fed. Reg. 51,735 (Oct. 4, 1993) (ordering agencies to consider "distributive impacts[] and equity" in designing regulations); *see also* Exec. Order No. 14,094, 88 Fed. Reg. 21,879 (requiring OMB review "to recognize distributive impacts and equity, to the extent permitted by law.")

[31] DRAFT STRATEGY, *supra* note 5, at 20.

[32] *Id*. at 21.

In order to better inform the public—particularly fence-line communities bearing the brunt of the plastic sector's environmental and human health impacts—about the performance of regulated sources and governmental oversight, EPA should also do the following:

(1) Create and maintain a comprehensive and publicly available database of companies that manufacture, sell, purchase, or distribute plastic resin and plastic products in the United States including environmental compliance and enforcement information. The database should also include companies that hold patents for plastic resin and plastic products that are manufactured, sold, purchased, or distributed in the United States;

(2) Create and maintain a comprehensive and publicly available database of existing federal, state, tribal, and local laws governing the oversight and operation of plastic sector facilities; and

(3) Overlay EPA's Environmental Justice Screening and Mapping Tool (EJScreen 2.0), the Council on Environmental Quality's Climate and Economic Justice Screening Tool, and Center for Disease Control's Social Vulnerability Index, and EPA's Pollution Prevention (P2) Environmental Justice (EJ) Facility Mapping Tool, into a single (user-friendly) visual map resource.

We request EPA closely coordinate with the States on enforcement and compliance issues relevant to our respective jurisdictions.

STAGE 2:
MATERIALS & PRODUCT DESIGN

I. EPA Should Prioritize Funding Innovative Strategies that Reduce Overall Plastic Use and Plastic Packaging Needs and Promote Reuse of Materials.

Sub-objective A1.3 calls for an innovation challenge program to develop alternatives to single-use, unrecycled, or frequently littered plastic products, funded through the Genius Prize for Save Our Seas Innovations under the Save Our Seas 2.0 Act and other funding opportunities across the federal government and through public-private partnerships.

Section 122 of the Save Our Seas 2.0 Act sets forth several categories of projects that may qualify for the Genius Prize for Save Our Seas Innovations, including "New designs or strategies to reduce overall packaging needs and promote reuse."[33] Although thoughtfully developing plastic alternatives is important (see Stage 2, Section II, below), EPA should prioritize funding projects that reduce or eliminate overall packaging needs and promote reuse of materials, which may include large-scale takeback programs for specific materials.

[33] 33 U.S.C. § 4232(a)(2)(E).

Even if alternatives are developed that are theoretically easier to manage than plastic waste, there may be trade-offs, negative externalities, and unintended consequences that may reduce the environmental benefit of the alternative. Moreover, non-conventional plastics do not necessarily offer different end-of-life scenarios than conventional plastics (i.e., landfill disposal or incineration) and can result in more environmental harm than conventional plastic. For example, plastics not derived from fossil fuels promise to be "sustainable" alternatives but their non-petroleum origins do not necessarily mean they can be recycled or composted. Plastics referred to as "bioplastics,"[34] or similar terms, are also more energy-intensive, land-use-intensive (to grow the feedstock), and cause more air pollution to manufacture than conventional plastic, and plastics claimed to be "biodegradable"—in other words, to degrade in the environment—may actually only fragment more rapidly into microplastics, rather than ecologically safe molecules, when released into a non-landfill environment.[35] Moreover, even for plastics that technically could be safely incorporated into usable compost, widespread use of compostable plastic would require a massive (expensive) infrastructure overhaul, as these types of plastic only degrade under very specific, high-heat conditions at industrial composting facilities, to which most Americans do not have access.[36]

EPA's primary goal here should be to reduce stress on our already overwhelmed waste management system by strategically reducing our reliance on single-use products, conventional plastic or otherwise. Implementing robust systems of reuse, which can be economically, socially, and environmentally beneficial, present a real opportunity to shift away from our current throw-away economy.[37] Indeed, a recent report by the United Nations Environment Programme found that promoting reuse options, including refillable bottles, bulk dispensers, deposit-return schemes, and packaging take-back schemes, could reduce plastic pollution by 30 percent by 2040.[38] Accordingly, available funding should prioritize incentivizing innovative collaboration among all levels of government and private firms to create systems of reuse on a massive scale.

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[34] "Bioplastic" is often used as an umbrella term that includes "bio-based plastic" (made from biological feedstock like corn), "biodegradable plastic" (conventional or bio-based plastic that can be broken down by bacteria or fungi into water, carbon dioxide, or naturally occurring minerals), and "compostable plastic" (can fully biodegrade under high-heat conditions at an industrial composting facility). GLOBAL ALLIANCE FOR INCINERATOR ALTERNATIVES, BIOPLASTIC 1 (2022), https://static1.squarespace.com/static/5eda91260bbb7e7a4bf528d8/t/629f2abd81cae042c741ef4e/1654598333506/UNEA-publication-packet_bioplastic.pdf.

[35] *Id*.

[36] *Id*.; *see also Frequently Asked Questions about Plastic Recycling and Composting*, U.S. EPA, https://www.epa.gov/trash-free-waters/frequently-asked-questions-about-plastic-recycling-and-composting#home (last visited May 25, 2022) ("Plastic that is labeled as compostable is generally intended to be sent to an industrial or commercial composting facility which has higher temperatures and different breakdown conditions than those found in a typical homeowner's compost bin.").

[37] *See* JUDITH HILTON ET AL., GLOBAL PLASTICS POLICY CENTRE, MAKING REUSE A REALITY: A SYSTEMS APPROACH TO TACKLING SINGLE-USE PLASTIC POLLUTION (2023), https://plasticspolicy.port.ac.uk/wp-content/uploads/2023/05/Making-reuse-a-reality-report_GPPC.pdf.

[38] UNEP, TURNING OFF THE TAP: HOW THE WORLD CAN END PLASTIC POLLUTION AND CREATE A CIRCULAR ECONOMY (May 16, 2023), https://wedocs.unep.org/bitstream/handle/20.500.11822/42277/Plastic_pollution.pdf?sequence=4.

States and municipalities are also bringing resources to bear for the development of reuse systems, and opportunities for co-financing and parallel funding should be explored. For example, Oregon will be channeling funding toward reuse system catalyzation through its Extended Producer Responsibility law, the Plastic Pollution and Recycling Modernization Act. While much of this Act focuses on recycling, a meaningful funding stream (up to 10 percent of producer funding under the new EPR scheme) for a department program that will support waste prevention and reuse is also created.[39]

II. EPA Should Coordinate with States and International Entities to Advance Scientific Frameworks to Evaluate the Full Range of Impacts Associated with Novel Alternatives to Conventional Plastic Materials and Products.

The States support Sub-objectives A2.1 (increase data availability and perform life cycle assessments of plastic and alternatives) and A2.2 (review, develop, update, and use sustainability standards, ecolabels, certifications, and design guidelines).

As novel alternatives to conventional petroleum-based plastic are developed, scientific frameworks are needed to inform decision-makers of the trade-offs between various materials and designs. Integrating risk assessments (e.g., reducing exposures and hazards of toxicants) and life cycle assessments that assess the impacts of specific materials and products from cradle-to-grave (e.g., energy and water consumption during production, air quality impacts, and microplastic and nanoplastic impacts of a material at the end of its lifecycle), can provide a reliable and holistic picture of each material's true impacts to the environment. In doing so, such assessments can provide adequate information to avoid unintended consequences and regrettable substitutions, while reducing reliance on synthetic polymers and conventional plastics that are persistent and pose risks to the environment and human health.

EPA's approach to plastic alternatives should include coordination with the States and relevant international entities that have experience developing strategies to guide the careful development of alternatives. For example, California's Statewide Microplastics Strategy calls for advancements in technology to identify alternative products, materials, and design to reduce plastic use and production. [40] This Strategy recommends sector-specific alternatives analyses be conducted to inform plastic pollution prevention strategies based on the use, cost-effectiveness, and benefit of each product and product alternative, life cycle assessments that incorporate global climate, social, and food security impacts consistent with the United Nations Sustainable Development Goals, and chemical additive safety to avoid regrettable substitutions.[41] Similarly, New Jersey's Plastics Advisory Council's First-Year Report calls for coordination between

[39] OR. REV. STAT. § 459A.941.
[40] CALIFORNIA OCEAN PROTECTION COUNCIL, STATEWIDE MICROPLASTICS STRATEGY: UNDERSTANDING AND ADDRESSING IMPACTS TO PROTECT COASTAL AND OCEAN HEALTH 13–14 (Feb. 2022) [hereinafter CA Microplastics Strategy], https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20220223/Item_6_Exhibit_A_Statewide_Microplastics_Strategy.pdf.
[41] *Id.*

States and the federal government to develop best practices for reducing plastics use, researching alternatives to plastics, and removing existing plastics from our ecosystem.[42]

Oregon, meanwhile, is initiating a rulemaking to fix standards and methods to be used for the evaluation of life cycle impacts in the context of its Plastic Pollution and Recycling Modernization Act.[43] Through this rulemaking, a set of rules allowing for comparison of life cycle impacts among products will be developed. Similar rules are being used to underpin eco-design laws in Europe. These rules will be more impactful if life cycle assessment methodologies are updated to fully account for emergent impacts of plastics, an effort that the federal government should support.

EPA should also coordinate and share information regarding alternative analyses and source reduction strategies with domestic and international interests.

III. EPA Should Adopt and Administer a National Plastic Products Labeling Standard to Combat the Widespread Deceptive Environmental Marketing of Plastic Products.

Greenwashing of plastic products is rampant.[44] A large part of the problem lies with the deceptive use of the chasing arrows (the universal recycling symbol) on plastic products that are not in fact recyclable, i.e., that lack economically viable end markets for the material. The plastics industry has maintained for decades that the use of the chasing arrows containing a number in their center is simply a way to identify the product's plastic resin type and not a claim that it is recyclable. As of 2021, 36 states still require that the resin identification code and chasing arrows appear on certain plastic products.[45] Although some states such as California have begun restricting the use of the chasing arrows,[46] or as is the case with Washington and Oregon, removed statutory requirements to include the chasing arrows with the resin identification code on plastic products,[47] the lack of a consumer-facing, credible, and unbiased national standard governing the environmental marketing of plastic products has led to widespread consumer confusion about plastics recyclability. Industry marketers have capitalized

[42] N.J. PLASTICS ADVISORY COUNCIL, FIRST-YEAR REPORT (2023), https://dep.nj.gov/wp-content/uploads/pac-first-year-report-2023.pdf.
[43] *Life Cycle Impact Evaluation*, OR. DEP'T ENV'T QUALITY, https://www.oregon.gov/deq/recycling/Pages/Life-Cycle-Impact-Evaluation.aspx (last visited Jun. 12, 2023).
[44] *See* Sandra Laville, *Coca-Cola among brands greenwashing over packaging, report says*, THE GUARDIAN (Jun. 30, 2022), https://www.theguardian.com/environment/2022/jun/30/coca-cola-among-brands-greenwashing-over-packaging-report-says ("Research exposes litany of misleading claims by household names, including Coca-Cola and Unilever."); *see also Attorney General Bonta Demands Manufacturers of Plastic Bags Substantiate Recyclability Claim,* CAL. OFF. ATT'Y GEN. (Nov. 2, 2022), https://oag.ca.gov/news/press-releases/attorney-general-bonta-demands-manufacturers-plastic-bags-substantiate.
[45] ALEX BERTOLUCCI, OR. DEP'T ENV'T QUALITY, RECYCLING LABELING LAWS TODAY – TRUTH IN LABELING TASK FORCE, https://www.oregon.gov/deq/recycling/Documents/recTILlawsToday.pdf.
[46] *See* S. 343, 2021–22 Leg., Reg. Sess. (Cal. 2021); CAL. PUB. RES. CODE §§ 17580 *et seq*. (prohibiting use of chasing arrows unless certain recyclability requirements are met).
[47] *See, e.g.,* S. 5022, 2021–22 Leg., Reg. Sess. (Wash. 2021) (removing requirement to have chasing arrows on plastic containers); S. 582, 2021 Leg., Reg. Sess. (Or. 2021) (removing requirement to have chasing arrows and resin identification codes on plastic containers).

on this void by creating and implementing massive-scale standardized recycling labeling systems, without any governmental oversight.[48] Several lawsuits have challenged the veracity of marketing claims made under these industry-run labeling systems—some resulting in settlements that require changes to product labels.[49]

EPA aptly described the issue of consumer confusion about plastics recyclability as a major impediment in the success of the nation's recycling system in its April 20, 2023, comment letter to the Federal Trade Commission.[50] There, to address consumer confusion and reduce "wishing-cycling," EPA recommended that the FTC's Green Guides do the following: (1) prohibit marketing of products and packaging as recyclable unless they have a strong end market, i.e., they are "reliably sold by recycling facilities for a higher price than the cost of disposal of the same material," and (2) restrict qualified claims related to access to recycling facilities including labels that instruct "store-drop off, which may be limited in scope and scale, and 'check locally' which has little value in assessing recyclability."[51]

Importantly, EPA stated that it "believes the use of the [resin identification code] with the chasing arrows symbol constitutes a misrepresentation and violation of claims prohibited under Section 5 of the FTC Act."[52] Citing to studies that showed that most Americans (68 percent) assumed products with the resin code symbol would be recyclable, EPA recommended updates to the Green Guides to reduce consumer confusion.[53]

EPA's Draft Strategy appropriately reflects these well-supported concerns about consumer confusion. The Draft Strategy calls for a review of the plastic resin identification codes to reduce consumer confusion (Sub-objective B5.3), an evaluation of degradability claims to eliminate greenwashing (Sub-objective B3.5), public messaging to increase public understanding of waste

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[48] *See, e.g.,* HOW2RECYCLE LABELING SYSTEM, https://how2recycle.info/join (last visited June 5, 2023) (listing hundreds of major brands and retailers as members of the labeling system).
[49] *See, e.g.,* Morgan Conley, *Keurig to Pay $10M, Edit K-Cup Labels to End False Ad Row*, LAW360 (Feb. 25, 2022), https://www.law360.com/articles/1468369/keurig-to-pay-10m-edit-k-cup-labels-to-end-false-ad-row ($10 million settlement of class-action lawsuit alleging that Keurig's single-serve coffee pods misled buyers into believing pods were more widely recyclable than they actually are); Jan Dell, *TerraCycle and Eight Consumer Product Companies Settle Lawsuit, Agree to Change Product Labels and TerraCycle Will Implement a Supply Chain Certification Program*, LAST BEACH CLEANUP (Nov. 15, 2022), https://www.lastbeachcleanup.org/_files/ugd/dba7d7_5e9e762530734ff7aec524d90c573bf3.pdf (TerraCycle agreed to product label changes to settle lawsuit alleging that TerraCycle's unqualified claims that their difficult-to-recycle plastic products were recyclable with TerraCycle was unlawful and deceptive); *but see* Jared Paben, *Greenpeace agrees to dismiss labeling lawsuit*, PLASTICS RECYCLING UPDATE (Jun. 22, 2022), https://resource-recycling.com/plastics/2022/06/22/greenpeace-agrees-to-dismiss-labeling-lawsuit/ (lawsuit alleging Walmart's use of How2Recycle labels deceptive dismissed on *standing* grounds, not on merits).
[50] U.S. EPA, Comments on the Federal Trade Commission's Proposed Rule entitled "Guides for the Use of Environmental Marketing Claims," Green Guides Review, Matter No. P954501 (Apr. 20, 2023), 15–18 [hereinafter EPA Comments to FTC].
[51] *Id*. at 15.
[52] *Id*.
[53] *Id*. at 16-17.

reduction, materials reuse, and composting options (Sub-objective B5.1), and increased awareness of the Green Guides among businesses (Sub-objective B5.2).[54]

The States support these sub-objectives, but ask that EPA take its efforts to reduce consumer confusion one step further by establishing a voluntary national plastics product labeling standard ("National Labeling Standard"). As EPA's comments to the FTC and the above sub-objectives demonstrate, a uniform, national standard for labeling is sorely needed. The National Labeling Standard should be clear, simple, credible, and, importantly, *unbiased*. While the private sector has created and implemented its own labeling systems, they have only resulted in more consumer confusion, as these systems often use "store-drop off" and "check locally" labels, which EPA has identified as having little value in informing consumers about recyclability.[55] Further, it is very difficult to verify that plastic items dropped off at these participating store locations are actually being recycled.

The National Labeling Standard can be modeled after other successful voluntary labeling systems such as the EPA-administered Energy Star.[56] EPA would develop eligibility criteria, and companies would have to adequately substantiate environmental marketing claims (recyclability, compostable, biodegradability, etc.) to use EPA's label on their products. Having a federal government-run National Labeling Standard will ensure an unbiased system that consumers can rely on in making well-informed buying decisions.

Moreover, assuming the National Labeling Standard is sufficiently rigorous so that all eligible products are actually, not just potentially, widely recycled, both government and industry stakeholders could leverage the National Labeling Standard. State and local jurisdictions could do so by incorporating it into laws and regulations. For example, the National Labeling Standard could be used to define materials that recycling programs are required to accommodate. Jurisdictions could also limit curbside collection to products that satisfy the National Labeling Standard, or a subset of such products. In turn, commercial product manufacturers would have a strong incentive to produce products they could label as meeting the National Labeling Standard. In each case, the National Labeling Standard would enable significant efficiency gains for existing recycling programs, and those gains would accelerate as consumers become familiar with the labeling program and jurisdictions, industry, and recycling programs rely on that familiarity to enhance laws, products, and recycling infrastructure.

These benefits depend on the National Labeling Standard to effectively identify only those products with a very high likelihood of being recycled. In developing the National Labeling Standard, EPA should work with all stakeholders, including the States, the FTC, and all other relevant federal agencies. While EPA's Draft Strategy currently calls for coordination among domestic and international interests to support developing international standards, which may

[54] DRAFT STRATEGY, *supra* note 5, at 25, 28–29.
[55] EPA Comments to FTC, *supra* note 50, at 15.
[56] About ENERGY STAR, ENERGY STAR, https://www.energystar.gov/about?s=footer (last visited Jun. 6, 2023).

include product labeling (Sub-objective A2.7),[57] we are asking that EPA establish a National Labeling Standard now while it continues to assess support for an international standard.

STAGE 3
WASTE GENERATION

I. EPA Should Broaden the Scope of Its Plastic Waste Reduction Strategy.

Sub-objective A1.1 proposes to identify and make a publicly available list of single-use, unrecyclable, or frequently littered plastic products to guide public and private purchasing decisions, and Sub-objective A1.5 proposes to set a new goal to reduce the production of such products.[58] EPA should broadly assess all plastic products across all sectors when determining which types of products will be listed. Large industries that heavily contribute to the growing amount of plastic waste must be considered. For example, EPA should consider the fast fashion industry, which produces and sells at high volumes cheap polyester (and other plastic) clothing that are minimally worn and disposed of quickly (or over-produced and never sold), resulting in one garbage truckload of textiles being landfilled or incinerated *every second*.[59] The Draft Strategy notes that EPA intends to develop a separate strategy on textiles.[60] To the extent this separate textiles strategy does not include fast fashion, however, EPA should address the issues in this broader national strategy.

The States recommend prioritizing the identification and prohibition of microplastics designed for deliberate release into the environment along the lines of the approach taken by the European Union. In January 2019, European Chemicals Agency (ECHA) proposed an EU-wide restriction on intentionally added, non-recoverable, microplastics.[61] The proposal places emphasis on restriction of intentionally added microplastics to products where their use will result in releases to the environment. The range of products containing intentionally introduced microplastics spans a wide range of industrial sectors including, but not limited to[62]:

- Cosmetic and personal care products (to provide a range of functions such as opacity control and silky feeling in rinse-off and leave-on cosmetics);

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[57] DRAFT STRATEGY, *supra* note 5, at 21.
[58] *Id*. at 17–18.
[59] ELLEN MCARTHUR FOUNDATION & CIRCULAR FIBRES INITIATIVE, A NEW TEXTILES ECONOMY: REDESIGNING FASHION'S FUTURE 37 (2017), https://emf.thirdlight.com/file/24/uiwtaHvud8YIG_uiSTauTlJH74/A%20New%20Textiles%20Economy%3A%20Redesigning%20fashion%E2%80%99s%20future.pdf.
[60] DRAFT STRATEGY, *supra* note 5, at 14.
[61] *See* EUROPEAN CHEMICALS AGENCY, ANNEX XV RESTRICTION REPORT tbl.6 (2019), https://echa.europa.eu/documents/10162/05bd96e3-b969-0a7c-c6d0-441182893720 (summary of uses and technical functions of microplastics in consumer and profession products); *id.* at tbl. 7 (microplastic releases via each of the three principal pathways to the environment); *id.* at tbl. 15 (summary table of releases to the environment from sector-specific product groups containing intentionally added microplastics).
[62] *Id.* at tbl. 6 (summary of uses and technical functions of microplastics in consumer and profession products).

- Agriculture and horticulture products (such as control release agents in fertilizers and plant/seed protection products);
- Detergents and maintenance products (such as fragrance encapsulation in laundry detergents and fabric softeners as well as in products for cleaning and polishing);
- Paint, coating, and ink products (such as polymer dispersion binders in water-based paint);
- Food complement products (such as control release agents in vitamins); and
- Oil and gas additives (such as lubricants and friction reducing agents used in drilling).

Similar to ECHA, EPA should identify all sector-specific product groups with intentionally added microplastics and recommend Congressional action to restrict uses, prohibiting those uses that are designed for direct release into the environment, or that are not adequately controlled through wastewater or solid waste disposal. For example, EPA should prohibit the intentional use of unrecoverable microplastics released directly into the environment such as, but not limited to, polymer films used to coat/encapsulate agricultural materials (plastic-coated seeds, fertilizers and pesticides, which directly contribute to microplastics in agricultural soils).[63]

II. EPA Should Conduct a Study to Determine the Amount of Plastic Waste the Federal Government Generates Per Year and Track Its Reduction Progress.

Sub-objective A1.2 proposes to develop a plan to reduce the federal government's plastics footprint, leveraging existing tools such as the General Services Administration's ("GSA") Green Procurement Compilation or Sustainable Facilities Tool.[64] The States support this objective, as the federal government is the world's single largest consumer of goods and services,[65] and the largest generator of plastic waste.[66]

The States also encourage EPA to work closely with GSA as the agency is currently exploring pathways to reduce the federal government's procurement of single-use plastics.[67] A number of the States here submitted comments to GSA encouraging the agency to phase out federal procurement of single-use plastics and consider replacing those products with sustainable, reusable alternatives.[68]

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[63] CENT. FOR INT'L ENV'T L., SOWING A PLASTIC PLANET: HOW MICROPLASTICS IN AGROCHEMICALS ARE AFFECTING OUR SOILS, OUR FOOD, AND OUR FUTURE 18–19 (2022); *see also* CA Microplastics Strategy, *supra* note 40, at 14 (listing agriculture sector under possible sector-specific topics for investigation).
[64] DRAFT STRATEGY, *supra* note 5, at 18.
[65] *Buying Green for Federal Purchasers*, U.S. EPA, https://www.epa.gov/greenerproducts/buying-green-federal-purchasers (last visited May 30, 2023).
[66] NAT'L ACADS., *supra* note 2, at 3 (noting that, in 2016, the U.S. is the world's "top generator of plastic waste").
[67] General Services Administration Acquisition Regulation (GSAR); Single-Use Plastics and Packaging, 87 Fed. Reg. 40,476, 40,476 (July 7, 2022) (defining single-use plastics as "plastic materials that are used and then immediately disposed of once the item is delivered")
[68] *See* Letter from Attorneys General for the District of Columbia et al., to Gen. Servs. Admin. (Sept. 6, 2022), https://oag.ca.gov/system/files/attachments/press-docs/2022-9-6%20Multistate%20Comments%20on%20GSA%20ANPR_.pdf.

In order to set a baseline and track the progress of EPA's plastic reduction efforts within the federal government, EPA should conduct a study to determine the amount of plastic procured and discarded by the federal government, including the military, on a yearly basis. EPA should utilize information provided by GSA to understand how many plastic products, including single-use plastic products, are procured by the federal government annually. A study could use those numbers as a baseline to then determine which federal agencies produce the most plastic waste to help EPA prioritize and target its strategy. EPA should also create guidelines for federal agencies to consistently track plastic waste data. The results of the study, and ongoing progress reports (issued annually), should be made publicly available online.

III. EPA Should Provide Technical Assistance and Tools to States, Localities, and Tribes to Implement Plastic Source Reduction Strategies.

In addition to identifying effective policy tools and approaches to reduce production of single-use, unrecyclable, *unrecoverable* (see above), or frequently littered products (Sub-objective A1.4),[69] EPA should provide technical assistance and tools to states, localities, and tribes to help implement plastic source reduction strategies. EPA should also affirmatively express its support for state, local, and tribal implementation of such plastic source reduction strategies.

The plastics industry should bear the costs of managing plastic waste.[70] Across the nation, states, localities, and tribes are implementing plastic source reduction strategies by targeting problematic plastic products such as unnecessary packaging and plastic bags and holding producers responsible for compliance. For example, several states, including California and Oregon, have passed extended producer responsibility laws for plastic waste that shifts the burden of plastic waste management to the plastics industry, which may affect companies along the entire plastic manufacturing and supply chain. In 2022, California enacted the Plastic Pollution Prevention and Packaging Producer Responsibility Act, which requires producers to meet ambitious recycling goals and source reduction requirements.[71] Oregon's Plastic Pollution and Recycling Modernization Act does not mandate source reduction, but as described above, channels producer funding toward it.[72] A new state law passed by the Oregon legislature in 2023 also enacts a partial ban on expanded polystyrene.[73] In 2020, New Jersey restricted single-use plastic bags.[74]

[69] DRAFT STRATEGY, *supra* note 5, at 14.
[70] OECD, *Recommendation of the Council on the Implementation of the Polluter-Pays Principle* (1974), https://legalinstruments.oecd.org/en/instruments/11 (the cost of managing pollution should be borne by the polluter).
[71] S. 54, 2021–22 Leg., Reg. Sess. (Cal. 2022).
[72] S. 582, 2021 Leg., Reg. Sess. (Or. 2021).
[73] S. 543, 2023 Leg., Reg. Sess. (Or. 2023).
[74] N.J. STAT. ANN. 13:1E-99.126 to -99.131.

However, not all states, localities, and tribes have the resources or capacity to implement these types of strategies and policies. EPA could play a crucial role in providing technical assistance and tools to advance these types of source reduction strategies at the state level.

In California, several state agencies provide technical assistance to localities seeking to implement plastic source reduction strategies. Below are examples in which the California Ocean Protection Council ("OPC")[75] successfully helped advance local implementation of plastic source reduction strategies:

(1) Implementing Pollution Prevention Strategies: Reusables Toolkit. In 2022, the non-profit UPSTREAM launched an OPC-sponsored Reusables Toolkit: Roadmap to Reuse to serve as a resource hub for local governments and businesses to reduce single-use plastics by providing technical assistance and tools to assist with the implementation of local comprehensive foodware ordinances.[76]

(2) Technical Assistance to Eliminate Single-Use Plastics in Los Angeles County Restaurants. OPC has recently supported the Los Angeles County Department of Public Works to enhance the County's implementation of a comprehensive plastic source reduction ordinance by funding outreach and technical assistance for over 2,600 impacted businesses, as well as public outreach and education (see Los Angeles County, Putting a Fork In It). Successful implementation of this ordinance has the potential to serve as a model to reduce or eliminate single-use food service ware statewide, including expanded polystyrene, and significantly reduce plastic in the waste stream and in the marine environment.[77]

(3) Unpackaging Alameda. In 2016, OPC funded a pilot project to "unpackage" Alameda. Through this project, the non-profit Clean Water Fund worked with 80 to 100 businesses in Alameda, California to reduce their reliance on single-use disposable food packaging and piloted changes in institutional purchasing to reduce the prevalence of single-use foodware that typically becomes plastic pollution.[78]

New York similarly provides education and technical assistance to localities seeking to implement plastic source reduction strategies under its Solid Waste Management Policy.[79] Projects include educational efforts to prevent the generation of waste, material re-use strategies, and promotion of product stewardship initiatives to name a few.

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[75] OPC is a California state agency committed to ensuring that California maintains healthy, resilient, and productive ocean and coastal ecosystems for the benefit of current and future generations.
[76] *A roadmap to reuse*, UPSTREAM, https://upstreamsolutions.org/roadmap-to-reuse/#resources (last visited May 30, 2023).
[77] *Putting a Fork In It*, LOS ANGELES COUNTY, https://ceo.lacounty.gov/2022/03/11/sustainability/putting-a-fork-in-it/ (last visited May 30, 2023).
[78] RETHINK DISPOSABLE & CLEAN WATER ACTION, UNPACKAGING ALAMEDA (2019), https://www.opc.ca.gov/webmaster/_media_library/2019/10/UnpackagingAlamedaOnePager_FINAL.pdf.
[79] *Waste Reduction,* N.Y. STATE DEPT. ENVIRONMENTAL CONSERVATION, https://www.dec.ny.gov/chemical/8502.html.

EPA should adopt a model of providing technical assistance and tools to states, localities, and tribes, and serve as a centralized hub to facilitate the exchange of ideas between governmental entities. With this information, EPA should support the development of model laws, strategies, and policies to address all aspects of the plastic waste life cycle.

IV. EPA Should Take Action to Address Plastic Tobacco Product Waste Through Educational Campaigns, Information Sharing, and Research on a Potential Cigarette Filter and Single-Use e-Cigarette Ban.

EPA should address in its Strategy single-use tobacco products, which often contain plastic components that are resistant to biodegradation and pollute the natural environment when discarded.[80]

Cigarette butts are the most common type of this tobacco waste. [81] They are also one of the most ubiquitous types of litter overall—in fact, the Ocean Conservancy reports that cigarette butts have been within the top two forms of trash most commonly collected in their International Coastal Cleanup each year for over three decades.[82] Almost all cigarette butts (99.8 percent) contain a filter made of cellulose acetate, a form of plastic, that is a significant source for microplastic pollution as discarded cigarette butts age and the plastic fibers break physically apart in the environment.[83] The tobacco industry has marketed cellulose acetate filters as a safety measure, but evidence indicates that they actually make smoking *more* dangerous because they make inhalation easier, are linked to an increased risk of lung adenocarcinoma (a more aggressive lung cancer cell type), and give smokers a false sense that the products are less risky.[84] The industry continues to perpetuate the myth that these filters are safer than unfiltered brands to increase profits, since cellulose acetate is cheaper than tobacco leaf and reduces the harshness of tobacco for cigarette smokers.[85]

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[80] Giuliano Bonanomi et al., *Cigarette butt decomposition and associated chemical changes assessed by 13C CPMAS NMR*, PLOS ONE, Jan. 2015, at 14 (finding that cigarette butts have a very low degradation rate, primarily because of the chemical composition of the cellulose); Francisco Belzagui et al., *Cigarette butts as a microfiber source with a microplastic level of concern*, SCI, TOTAL ENV'T, 2021, at 6 (finding that microfibers from smoked cigarette filters have low decomposition rate leading to high exposure and toxicity in aquatic environment).
[81] Marc W. Beutel et al., *A Review of Environmental Pollution from the Use and Disposal of Cigarettes and Electronic Cigarettes: Contaminants, Sources, and Impacts*, SUSTAINABILITY, Nov. 2021, at 6 (describing that an "estimated 4.5 trillion [cigarette butts] are littered each year into the environment").
[82] *Cleanup Reports: The International Coastal Cleanup*, OCEAN CONSERVANCY, https://oceanconservancy.org/trash-free-seas/international-coastal-cleanup/annual-data-release/ (last visited May 26, 2023) (In 2021, the Ocean Conservancy reported collecting 1,134,292 cigarette butts.).
[83] THOMAS E. NOVOTNY ET AL., CALIFORNIA TOBACCO CONTROL PROGRAM, CALIFORNIA DEPARTMENT OF PUBLIC HEALTH, TOBACCO PRODUCT WASTE IN CALIFORNIA: A WHITE PAPER 11 (2022).
[84] Min-Ae Song et al., *Cigarette Filter Ventilation and its Relationship to Increasing Rates of Lung Adenocarcinoma*, JOURNAL OF THE NATIONAL CANCER INSTITUTE, May 2017, at 12–13.
[85] Novotny et al., *supra* note 83, at 23; Thomas E. Novotny & Laila Hamzai, *Cellulose acetate cigarette filter is hazardous to human health*, TOBACCO CONTROL, 2023, at 2.

When littered or otherwise discarded, the filter breaks down into toxic-laden microplastic fibers that contaminate soil and aquatic environments and are hazardous to birds, fish, whales, and other organisms.[86] These microplastics also have the potential to contaminate drinking water and bioaccumulate in animals.[87] It is estimated that 0.3 million tons of microfibers per year may be introduced to the aquatic environment from plastic cigarette filters.[88] Additional increasingly popular forms of harmful plastic tobacco waste are single-use electronic cigarettes (e-cigarettes) and e-cigarettes with disposable cartridges.[89] Discarded e-cigarettes not only contribute to plastic pollution, but they also introduce other waste materials hazardous to environmental and human health, like batteries and nicotine residue, into the natural environment.[90]

Further, toxic plastic tobacco waste is an environmental justice problem. Plastic tobacco waste and its harmful impacts are concentrated around areas where cigarettes are sold or consumed, which are more likely to be communities of color and low-income communities due to disparities in tobacco industry marketing.[91]

The States support many of the general recommendations targeting plastic litter and microplastics outlined in the Draft Strategy. However, given its ubiquity and associated harm, we also recommend that EPA implement the following strategies that specifically target plastic single-use tobacco waste:

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[86] Belzagui, *supra* note 80*,* at 5 (Microfibers from smoked cigarette filters "should be considered as a potential risk for the aquatic environment for several reasons: the possible hazards linked to their size, morphology, and capacity to adsorb, transport, and release toxic substances; and the potential exposure to biota linked to the large quantity of SFs dumped into the environment."); Maria Christina B. Araújo & Monica F. Costa, *A critical review of the issue of cigarette butt pollution in coastal environments*, 172 ENV'T RSCH. 137, 139 (Cigarette butts have been found in the stomach contents of marine fauna and chemicals from the cigarettes, ingested or not, can be harmful to organisms.); Thomas E. Novotny et al., *Tobacco and cigarette butt consumption in humans and animals*, 20 TOBACCO CONTROL i17, i19 (finding that cigarette butt leachates can be poisonous to animals that ingest them); Belzagui, *supra* note 80, at 2 (describing that cigarettes contain more than 70 carcinogenetic chemicals, and more than 200 toxic compounds, which can contaminate the cellulose acetate filter).

[87] Stephanie L. Wright et al., *Bioaccumulation and biological effects of cigarette litter in marine worms,* SCIENTIFIC REPORTS, Sept. 2015, at 1; Novotny & Hamzai, *supra* note 85 (compiling studies showing ecotoxicity of the cellulose acetate cigarette filter to various organisms).

[88] Belzagui, *supra* note 80, at 6.

[89] *See* Harry Tattan-Birch, Jamie Brown, & Sarah E. Jackson, '*Give 'em the vape, sell 'em the pods': razor-and-blades methods of pod e-cigarette pricing*, 31 TOBACCO CONTROL 773, 773 (2021) (noting a strategy by pod electronic cigarette manufacturers to sell disposable cartridges pre-filled with e-liquid); Maria Cooper et al., *Notes from the Field: E-cigarette Use Among Middle and High School Students — United States, 2022*, 71 MORBIDITY & MORTALITY WKLY. REP. 1283, 1283–84 (2022) (finding that "since 2014, e-cigarettes have been the most commonly used tobacco product among U.S. middle and high school students" and in 2022 14.1 percent of high school students used e-cigarettes, more than half being disposable products).

[90] Yogi Hale Hendlin*, Alert: Public Health Implications of Electronic Cigarette Waste*, 108 AM. J. PUB. HEALTH 1489, 1489 (2018) (discussing that plastic e-cigarette devices and capsules are often littered, and devices can leach heavy metals, battery acid, and nicotine).

[91] Maacah Marah & Thomas E. Novotny, *Geographic patterns of cigarette butt waste in the urban environment*, 20 TOBACCO CONTROL i42, i44 (2011); Joseph G.L. Lee et al., *A Systematic Review of Neighborhood Disparities in Point-of-Sale Tobacco Marketing*, 105 AMERICAN J. PUB. HEALTH e8, e16 (2015).

(1) Fund and implement an educational campaign or hazard label program. There is an information gap in the public's understanding of the potential environmental and health harms of plastic tobacco waste, particularly cigarette filters.[92] Studies have shown that over 70 percent of people do not know that cigarettes contain plastic, and some people believe that cigarette butts are biodegradable.[93] People also may not understand the high costs of voluntary cleanups.[94] A comprehensive educational campaign or warning label explaining the inefficacy of cigarette filters and the environmental risks of plastic tobacco waste could have a meaningful impact on producer and consumer behavior. EPA should also include information about plastic tobacco product waste and its environmental and health hazards in a central location on the EPA website to ensure consumers have easy access to reputable and accurate information.

(2) Collaborate with the Food and Drug Administration and other federal agencies to share findings and coordinate policy ideas. For example, because the FDA has regulatory authority over tobacco product warnings related to smoking and health,[95] EPA could consider collaborating with it to provide up-to-date research to inform a hazard label or educational campaign.

(3) Facilitate discussions among states and invest in research to develop model policies and strategies. For example, the California Tobacco Control Program in the Department of Public Health has commissioned significant research into the problem of plastic tobacco product waste and potential state and local policies such as hazardous waste regulation, extended producer responsibility programs, fees to offset cleanup costs, and more.[96] Discussion among states as more research is done and these kinds of policies are implemented would help develop best practices more quickly.

(4) Research and explore the possibility of recommending legislation to Congress that phases out or bans the sale and manufacturing of plastic single-use tobacco products, particularly cellulose acetate cigarette filters and single-use e-cigarettes. The World Health Organization and agencies in other countries have recently recommended a cigarette filter ban due to the filters' negative environmental impacts and lack of proven health benefits.[97] California's Ocean Protection Council also recommended a ban of cigarette

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[92] Novotny, *supra* n. 83, at 33–34.
[93] Minal Patel et al. *Support for cigarette waste policies among U.S. adults*, 32 TOBACCO CONTROL 118, 118–20 (2021) ("Regardless of smoking status, 71% did not know plastic was a cigarette filter component and 20% believed filters were biodegradable.").
[94] See Novotony, *supra* note 83, at 33.
[95] Federal Cigarette Labelling and Advertising Act, 15 U.S.C. §§ 1331–1340.
[96] Novotony, *supra* note 83, at 40–41.
[97] WHO, TOBACCO: POISONING OUR PLANET 8 (2022), https://apps.who.int/iris/bitstream/handle/10665/354579/9789240051287-eng.pdf?sequence=1&isAllowed=y; BELGIUM SUPERIOR HEALTH COUNCIL, THE IMPACT OF CIGARETTE FILTERS ON PUBLIC HEALTH AND THE BELGIAN ENVIRONMENT 1 (Apr. 2023), https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/20230426_shc_9726_cigarette_filters_vweb.pdf.

filters and other single-use tobacco products, such as single-use e-cigarettes and cigar tips.[98] Governments are beginning to take action on these recommendations; some municipalities in the United States have already successfully banned the sale of tobacco products and states have proposed legislation to ban single-use tobacco products.[99] EPA should research the option further, including the efficacy of plastic cigarette filters and their environmental impacts, and consider proposing a federal ban on cellulose acetate filters and/or single-use e-cigarettes to Congress.

STAGE 4
WASTE MANAGEMENT

I. EPA Must Not Consider Any Process Other Than Mechanical Recycling to Qualify as "Recycling" Unless the Process Meets Rigorous Standards that Promote Circularity and Protect the Environment and Human Health.

EPA seeks feedback on the following questions regarding processes other than mechanical recycling:

> *What criteria should processes other than mechanical recycling meet to be considered "recycling activities" (e.g., "plastics-to-plastics outputs are 'recycling' if the output is a product that could again be recycled into another product or to [the] extent that it can achieve viable feedstock for new plastic materials")? How should health and environmental impacts be considered in these criteria?*[100]

EPA has already determined that the conversion of plastic waste to fuels or fuel substitutes, or for energy generation, is not "recycling."[101] We urge EPA to fully investigate any processes other than mechanical recycling, including those that purport to convert plastic waste into petrochemical feedstock, waxes, or other chemicals, before allowing them to count as "recycling." Any process other than mechanical recycling must meet the following standards to be considered "recycling":

(1) Material retention threshold. The process must meet minimum material retention thresholds. Material retention accounts for plastic lost during sorting and pretreatment, and importantly, process yields. Mechanical recycling, though imperfect, has a material retention of 73 to 84 percent.[102] Most of what goes into the process comes back out as a

[98] CA Microplastics Strategy, *supra* note 40, at 11.
[99] Manhattan Beach, Cal., Ordinance 20-0007 (Feb. 18, 2020); Beverly Hills, Cal. Ordinance 19-O-2783 (June 4, 2019); A.B. 1690, 2022 Leg., Reg. Sess. (Cal. 2022) (originally banned the sale of all single-use tobacco products when introduced in January 2022). The Public Health Law Center has a toolkit with some model language for a tobacco product sale ban on the local level that may be useful here. PUB. HEALTH L. CTR., TOBACCO PRODUCT WASTE: A PUBLIC HEALTH AND ENVIRONMENTAL TOOLKIT (2022), https://www.publichealthlawcenter.org/sites/default/files/resources/Tobacco-Product-Waste-Toolkit.pdf.
[100] DRAFT STRATEGY, *supra* note 5, at 3.
[101] *Id*. at 15.
[102] Taylor Uekert et al., *Technical, Economic, and Environmental Comparison of Closed-*

useable output. However, some processes that purport to convert plastic waste into petrochemical feedstock for plastic such as pyrolysis and gasification produce very low yields of monomers that can be re-polymerized as plastic. A recent U.S. Department of Energy study found that pyrolysis and gasification technologies have material retentions of only 1 to 14 percent.[103] This means that 86 to 99 percent of the plastic waste that undergoes these processes do not become plastic, and such processes cannot reasonably be characterized as "circular."[104]

At a minimum, EPA's determination of the material retention threshold should be guided by the tenets of a circular economy, set forth in the Save Our Seas 2.0 Act; i.e., to be considered "recycling," any process other than mechanical recycling must be restorative or regenerative, enable resources to maintain their highest values for as long as possible, and aim for the elimination of waste.[105] Processes that do not retain at the very least *most* of the material inputted should not be considered by EPA to be part of a circular economy.

EPA can also look to the states for guidance. Some states are currently considering material retention thresholds (through minimum process yields) for their statewide extended producer responsibility programs. For example, under the California Plastic Pollution and Packaging Producer Responsibility Act (Senate Bill 54), to be considered "recycled," a covered material (which may include certain plastic products) must be sent to a "responsible end market."[106] The California Department of Resources Recycling and Recovery is currently considering regulations that would require a 60 percent minimum recycling yield for an entity to be deemed "responsible" under the Act.[107] Similarly, the Oregon Plastic Pollution and Recycling Modernization Act 2023 requires producer responsibility organizations to submit to the Oregon Department of Environmental Quality a plan to implement a producer responsibility program, which will, among other requirements, "[e]nsure that any material that will be marketed for use through a method other than mechanical recycling will be transferred to a responsible end market."[108] The Oregon Department of Environmental Quality recently proposed rules that would require a process yield of 60 percent to qualify as a "responsible end market."[109] When

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Loop Recycling Technologies for Common Plastics, 11 AMERICAN CHEMICAL SOC'Y SUSTAINABLE CHEMISTRY & ENG'G 965, 969 (2023).

[103] *Id*.

[104] *Id*.; *see also* ANDREW N. ROLLINSON & JUMOKE OLADEJO, GLOBAL ALLIANCE FOR INCINERATOR ALTERNATIVES, CHEMICAL RECYCLING: STATUS, SUSTAINABILITY, AND ENVIRONMENTAL IMPACTS 30 (2020), https://www.no-burn.org/wp-content/uploads/CR-Technical-Assessment_June-2020.pdf (finding that with "chemical recycling" "very little of the original material can return to the economy as new plastic.").

[105] 33 U.S.C. § 4201(1).

[106] CAL. PUB. RES. CODE § 42041(aa)(3).

[107] CALIFORNIA DEPARTMENT OF RESOURCES RECYCLING AND RECOVERY, SB 54 INFORMAL RULEMAKING WORKSHOP: MAY 2023 WORKSHOP DISCUSSION DOCUMENT – 2, TOPIC: RESPONSIBLE END MARKETS 11 (May 31, 2023), https://www2.calrecycle.ca.gov/PublicNotices/Documents/14980.

[108] OR. REV. STAT. § 459A.875(2)(a)(I).

[109] STATE OF OR. DEPT. OF ENV'T QUALITY, DRAFT RULES, OAR-340-090-0630(2)(A)(D), https://www.oregon.gov/deq/rulemaking/Documents/rec2023m6Rules.pdf.

determining a material retention threshold, EPA must ensure that, *at a minimum,* any process (other than mechanical recycling) demonstrates that most of what is inputted into the process comes back out as a product (e.g., pyrolysis oil) that can be used to make new plastic.

(2) Proven scalability. The process must prove its viability in the real world and that it is commercially scalable. Mechanical recycling is based on proven technologies and clear economics. However, as the 2022 National Academies Report found, "processes that strive toward material circularity, such as depolymerization to monomers, are in early research and development stages. Such processes remain unproven to handle the current plastic waste stream and existing high-production plastics."[110] Some believe it will take almost two decades to achieve growth scale.[111]

EPA must not allow unproven processes to proceed as recycling activities based on *promises* that they will scale. Many of these purportedly "new" or "emerging" technologies such as pyrolysis and gasification have existed in some form since at least the 1950s. [112] Attempts to use such heat-based processes to recover plastic waste began at least as early as the 1970s.[113] Indeed, in 1993, the American Plastics Council (a predecessor of the American Chemistry Council) was touting pyrolysis as a solution to the growing plastic waste crisis.[114]

Thirty years later, proponents of pyrolysis and gasification continue to promise that these technologies will scale at some point in the unknown future. Several unsuccessful pyrolysis and gasification projects that have shuttered or indefinitely suspended operations tell a different story.[115] Further, owing to the lack of transparency, it is unclear whether the ones that remain in active operation actually use output from pyrolyzed or gasified plastic waste in plastic products sold back to consumers. For example, according to the Natural Resources Defense Council, a pyrolysis facility in Tigard, Oregon, which claims to convert polystyrene waste into styrene, apparently ships the styrene it produces across the country to be burned, rather than using the styrene to make new plastic.[116]

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[110] NAT'L ACADS., *supra* note 2, at 71.
[111] CLOSED LOOP PARTNERS ACCELERATING CIRCULAR SUPPLY CHAINS FOR PLASTICS: A LANDSCAPE OF TRANSFORMATIONAL TECHNOLOGIES THAT STOP PLASTIC WASTE, KEEP MATERIALS IN PLAY AND GROW MARKETS 16 (2021), https://www.closedlooppartners.com/wp-content/uploads/2021/01/CLP_Circular_Supply_Chains_for_Plastics_Updated.pdf.
[112] DENIS PATEL ET AL., GLOBAL ALLIANCE FOR INCINERATOR ALTERNATIVES, ALL TALK AND NO RECYCLING: AN INVESTIGATION OF THE U.S. "CHEMICAL RECYCLING" INDUSTRY 3–5 (2020), https://www.no-burn.org/wp-content/uploads/All-Talk-and-No-Recycling_July-28.pdf.
[113] *Id*. at 3.
[114] GREENPEACE, CIRCULAR CLAIMS FALL FLAT AGAIN (2022 UPDATE) 16–17 (2022), https://www.greenpeace.org/usa/reports/circular-claims-fall-flat-again/.
[115] Joe Brock et al., *The Recycling Myth: Big Oil's Solution for Plastic Waste Littered with Failure*, REUTERS (Jul. 29, 2021), https://www.reuters.com/investigates/special-report/environment-plastic-oil-recycling/.
[116] VEENA SINGLA, NATURAL RESOURCES DEFENSE COUNCIL, RECYCLING LIES: "CHEMICAL RECYCLING" OF PLASTIC IS JUST GREENWASHING INCINERATION 4 (Nov. 2022), https://www.nrdc.org/sites/default/files/chemical-recycling-greenwashing-incineration-ib.pdf.

(3) Net environmental benefit. The process must demonstrate a net environmental benefit. Plastics, by design, already include various toxic additives such as flame retardants and plasticizers.[117] Making matters worse, the heat used in pyrolysis and gasification forms new cancer-causing toxicants such as benzene.[118] Unsurprisingly, pyrolysis and gasification release harmful pollutants that increase risks for cancer, respiratory infections, kidney damage, and neurotoxicity.[119] These processes also generate large amounts of hazardous waste. For example, an investigation by the Natural Resources Defense Council revealed that in 2019, just one pyrolysis facility located in Tigard, Oregon alone generated nearly 500,000 pounds of hazardous waste—most of which consisted of benzene but also included other toxics such as lead, cadmium, and chromium.[120] Other non-heat processes such as solvent-based processes also generate large amounts of hazardous waste.[121] EPA must ensure that our air, water, and environment are safeguarded from pollution, and that any process purporting to "recycle" plastic waste actually provides a net environmental benefit.

(4) Environmental justice. The process must not increase the environmental and human health burdens of local communities. As discussed above, pyrolysis and gasification have been found to emit highly toxic chemicals that increase the risk of devastating illnesses to surrounding communities. Pyrolysis and gasification facilities, and the toxic chemicals they emit, are disproportionately located in communities of color and low-income communities.[122] EPA must ensure that any new or existing recycling facilities do not increase the burdens that these communities already face.

(5) Carbon footprint. The process must emit less greenhouse gas emissions than the production of virgin plastic. The whole point of recycling is to displace production of virgin materials. Mechanical recycling is a less carbon-intensive process than producing virgin plastic.[123] Some of these other-than-mechanical-recycling processes such as pyrolysis and gasification have large carbon footprints, with some studies showing that they emit over double the amount of greenhouse gas emissions as compared to mechanical recycling.[124]

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[117] ROLLINSON & OLADEJO, *supra* note 4, at 21–22.
[118] *Id*.
[119] THE PEW CHARITABLE TRUSTS ET AL., *supra* note 17, at 35.
[120] SINGLA, *supra*, note 116, at 5.
[121] *Id*. at 2.
[122] SINGLA, *supra* note 116, at 7; KEVIN BUDRIS, JUST ZERO, LOOPHOLES, INJUSTICE, & THE "ADVANCED RECYCLING" MYTH 28–32 (Dec. 2022), https://just-zero.org/wp-content/uploads/2022/12/2022-12-14-Just-Zero-Advanced-Recycling-Report.pdf.
[123] THE ASSOCIATION OF PLASTIC RECYCLERS, VIRGIN VS. RECYCLED PLASTIC LIFE CYCLE ASSESSMENT ENERGY PROFILE AND LIFE CYCLE ASSESSMENT ENVIRONMENTAL BURDENS 1 (May 12, 2020), https://plasticsrecycling.org/images/library/APR-Recycled-vs-Virgin-May2020.pdf.
[124] THE PEW CHARITABLE TRUSTS ET AL., *supra* note 17, at 44 fig. 20; GLOBAL ALLIANCE FOR INCINERATOR ALTERNATIVES, CHEMICAL RECYCLING: DISTRACTION, NOT SOLUTION 5 (2020), https://www.no-burn.org/wp-content/uploads/CR-Briefing_June-2020.pdf; *see also* Uekert et al., *supra* note 102, at 969 ("mechanical recycling has lower GHG emissions than chemical recycling, landfilling, or incineration.").

(6) Chain of custody. Proponents of any process must demonstrate that any output from the process (e.g. pyrolysis oil) can be tracked from the point the output is created through the process of making an end product. EPA should model such a "cradle-to-grave" tracking requirement after EPA's Hazardous Waste Electronic Manifest System (e-Manifest), which tracks hazardous waste from point of generation, through transportation, to the final treatment, storage, and disposal facility.[125] EPA should also require detailed recordkeeping to ensure that the output can be credibly and accurately tracked.

In order to protect the environment and human health from unproven and polluting activities, EPA must require that any processes other than mechanical recycling meet at least these six criteria to be considered "recycling" for purposes of EPA's Strategy.

II. EPA Should Address Circular Economy Rebound.

The Save Our Seas 2.0 Act defines a "circular economy" as "an economy that uses a systems-focused approach and involves industrial processes and economic activities that—(A) are restorative or regenerative by design; (B) enable resources used in such processes and activities to maintain their highest values for as long as possible; and (C) aim for the elimination of waste through the superior design of materials, products, and systems (including business models)."[126]

Recycling is often heralded as an important element of a circular economy as a way to "close the loop" on material consumption and end-of-life management. However, a growing body of research suggests that merely closing material loops does not necessarily ensure a net environmental benefit. This is because products made from recycled materials do not necessarily displace products made from virgin materials on a 1:1 basis, as proponents of the circular economy might assume.[127] In fact, circular economy activities such as recycling can actually lead to increased levels of production, reducing or even eliminating the environmental benefit of the activities.[128] For example, secondary materials, such as recycled products, may displace material of a different kind or may lower prices and increase overall demand for items produced from that material.[129] The circular economy can in fact "backfire by increasing overall production and use of products and therefore environmental impact."[130] This concept is called "circular economy rebound."

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[125] *The Hazardous Waste Electronic Manifest (e-Manifest) System*, U.S. EPA, https://www.epa.gov/e-manifest (last visited May 31, 2023).
[126] 33 U.S.C. § 4201(1).
[127] For example, the "Circular Economy System Diagram" from the Ellen MacArthur Foundation "view[s] the world as an engineering model with flows seemingly traveling directly from consumer to collector to secondary processor to manufacturer back to the consumer" without taking into account economic markets in which secondary goods compete directly with primary goods in an interaction that is difficult to predict. Trevor Zink & Roland Geyer, *Circular Economy Rebound*, 21 J. INDUS. ECOLOGY 1, 4 (2017).
[128] *Id*. at 1.
[129] *Id*. at 2.
[130] *Id.* at 3.

With respect to plastics recycling, circular economy rebound may occur because recycled plastics "rarely compete directly with primary materials due to degradation in the quality of the polymer…during use, collection, and reprocessing."[131] As a result, recycled plastics "are likely to be produced *in addition to*, rather than instead of, primary materials, and the potential benefits of recycling will be reduced."[132] Moreover, it is likely that as a result of increased plastic recycling, more goods are now produced, sold, and used, because recycled plastic is often of a lower quality and will need to be sold to end users at a discount, lowering the price of plastic overall and increasing demand for materials.[133] And importantly, "increased emphasis on recycling could lead consumers to purchase more disposable products, believing they can erase their impact at the recycling bin."[134] Because of this circular economy rebound, there may be increased growth in plastic production and therefore waste, and a reduction in expected environmental benefits from recycling.

EPA should consider potential circular economy rebound effects in its Strategy. First, it is necessary to consider whether circular economy activities such as plastics recycling produce products and materials that truly are substitutes for primary production alternatives.[135] Second, it is necessary to consider that circular economy activities increase aggregate demand for plastic by lowering its price.[136] Third, it is also necessary to determine whether circular economy activity actually draws consumers away from products made of virgin plastic. "In other words, substitution from primary to secondary goods must actually occur."[137]

Therefore, in order to ensure that the nation's recycling efforts actually produce an environmental benefit, EPA should study and take into account circular economy rebound.

III. EPA Should Research and Develop Policies to Address Microplastics Emitted During the Recycling Process.

Mechanical recycling is an important component of reducing plastic pollution, but plastic mechanical recycling facilities themselves also can contribute to the problem by releasing microplastics into the environment.[138] Mechanical recycling involves several steps; plastics are

[131] *Id*. at 5, citing Julian M. Allwood, *Squaring the circular economy: The role of re- cycling within a hierarchy of material management strategies*, *in* HANDBOOK OF RECYCLING (E. Worrell & M. Reuter eds., 2014).
[132] *Id*. at 5–6 (emphasis added).
[133] *Id*. at 6.
[134] *Id*.
[135] *Id.* at 7.
[136] *Id*.
[137] *Id*.
[138] Go Suzuki et al., *Mechanical recycling of plastic waste as a point source of microplastic pollution*, 303 ENV'T POLLUTION 1,6 (2022) (examining recycling facilities in Vietnam and finding that, without proper treatment, large amounts of microplastics are generated and introduced into the environment during the mechanical recycling process); Erina Brown et al., *The potential for a plastic recycling facility to release microplastic pollution and possible filtration remediation effectiveness*, J. HAZARDOUS MATERIALS ADVANCES, 2023, at 8 (finding that the studied plastics recycling facility in the United Kingdom generated and released microplastics into waterways); Yuwen Guo et al., *Ignored microplastic sources from plastic bottle recycling,* SCIENCE TOTAL ENV'T, 2022, at 6

sorted, washed, crushed and broken down, and re-processed.[139] The abrasion used in these processes creates microplastics, which can end up in the recycling facility's wastewater when the plastic is washed at various stages.[140] A recent study on one facility found that up to thirteen percent of the mass of the plastic waste originally brought to the facility was converted to microplastics and released in wastewater, depending on the filtration system.[141] When the wastewater is discharged after treatment, the remaining microplastics can end up in waterways and aquatic environments.[142] Filtration systems can effectively reduce the amount of microplastics in the wastewater, though the systems currently used do not catch all plastics, especially very small particles.[143] And even if microplastics are removed through filtration, they may still end up in the environment when disposed of as sludge.[144]

Moreover, the health and environmental harms caused by microplastics have the potential to particularly burden environmental justice communities. Waste facilities are disproportionately located in communities of color and low-income communities and therefore their waterways and environment are more likely to be contaminated by microplastics from recycling facilities.[145] Further, microplastics can linger in the atmosphere of recycling facilities, exposing workers and others to potential illnesses if they inhale them.[146]

To advance EPA's commitment to improving post-use materials management (Objective B) and preventing microplastics from entering waterways (Objective C), we encourage EPA to invest in research, technologies, and policies that address this crucial source of microplastics.

(examining PET bottle recycling facilities in China and finding that they generate significant amounts of microplastics in wastewater, not all of which are captured by current treatment methods).

[139] Valerio Guido Altieri et al., *Treating and reusing wastewater generated by the washing operations in the non-hazardous plastic solid waste recycling process: Advanced method vs. conventional method,* J. ENV'T MANAGEMENT, 2021, at 2.

[140] Brown et al., *supra* note 138, at 8 (finding "very high concentrations of small [microplastics]" in the wastewater of a plastics recycling facility).

[141] *Id*. at 7.

[142] Emilie M. F. Kallenbach et al., *Plastic recycling plant as a point source of microplastics to sediment and macroinvertebrates in a remote stream*, MICROPLASTICS AND NANOPLASTICS, 2022, at 13 (finding high concentrations of microplastics in a remote stream near a plastic recycling facility pointing towards "mismanagement of plastic waste products resulting in losses to the environment").

[143] Brown et al., *supra* note 138, at 4–8 ("The installed filtration efficacy comparing pre-filtration and postfiltration samples identified filtration to be effective for larger [microplastic] particles but allowed smaller [microplastics]."); Guo et al., *supra* note 138, at 6 ("[R]emoval efficiencies were low for small plastic particles, especially those in the size range of 0.1– 0.25 mm.").

[144] Guo et al., *supra* note 138, at 6 (noting that "the sludge from plastic waste recycling might be a significant source of microplastics in the environment," especially since it is often disposed of as agricultural fertilizer).

[145] Robert D. Bullard, *Race and Environmental Justice in the United States*, 18 YALE J. INT'L L. 319, 321 (1993); Vicki Been, *What's Fairness Got to Do with It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001, 1009–15 (1993).

[146] Brown et al. *supra* note 138, at 7–8 (finding high levels of microplastics in the atmosphere of plastics recycling facility); Lauren C. Jenner et al., *Detection of microplastics in human lung tissue using μFTIR spectroscopy*, 831 SCIENCE TOTAL ENV'T, 2022, at 8 (finding microplastics in all regions of human lungs); Joana Correia Prata, *Airborne microplastics: Consequences to human health?*, 234 ENV'T POLLUTION 115, 123 (2018) ("[A]irborne microplastics have the potential to cause airway and interstitial lung diseases.").

EPA should conduct further research on: (1) the amount and types of microplastics generated in different types of recycling facilities, (2) the best filtration and treatment technologies, especially those able to remove very small microplastics,[147] and (3) optimal product designs and processes to ensure that minimal microplastics are created in the first place and released into the air.[148] EPA should then develop or recommend policies to encourage recycling facilities to track microplastics and adopt technologies so that they do not contribute to the very problem that they purport to solve.

The responsible end market standard referenced above and included in extended producer responsibility laws in California, Oregon, and Colorado includes a waste containment requirement that will apply to recyclers processing materials collected for recycling in those states. It could be used to leverage filtering improvements at recycling facilities. The federal government should apply this standard in its procurement of materials that contain post-consumer recycled content.

STAGE 5:
WASTE IN THE ENVIRONMENT

I. EPA Should Develop and Update Technical Guidance and Tools to Support the Implementation of Policies, Programs, and Permit Requirements to Prevent the Discharge of Trash and Microplastic Debris into Waterways.

Stormwater mobilizes a range of pollutants, including trash and micro/nanoplastics from land into receiving waters, such as rivers, estuaries, and the ocean. Interception of trash (>5mm) and micro/nanoplastics (<5mm) is critically needed to prevent contamination in the aquatic environment.

In advancing actions under Objective C (Prevent Trash and Micro/Nanoplastics from Entering Waterways and Remove Escaped Trash from the Environment), EPA should consider use of some California policies and water quality requirements to develop and provide technical guidance and tools for optional approaches that other states could implement to manage trash and microplastic debris. California specifically has a unique series of existing policies and water quality requirements to address and manage trash, which is comprised largely of plastic,[149] and microplastic pollution, including but not limited to Trash Total Maximum Daily Loads (TMDLs) in specific watersheds, statewide Trash NPDES requirements ("Trash Provisions"), and requirements to address microplastics in drinking water. The States acknowledge that in promoting any of these tools for broader application, EPA should allow states to develop tools

[147] Sand filtration is one option for treatment that EPA should explore. A recent study found that these filters are economical and are highly efficient in removing microplastics from wastewater, though more research is needed on their long-term efficacy. *See* Muhammad Umar, Cecilie Singdahl-Larsen & Sissel Brit Ranneklev, *Microplastics Removal from a Plastic Recycling Industrial Wastewater Using Sand Filtration*, 15 WATER 896 (2023).
[148] Guo et al., *supra* note 138, at 6.
[149] *See, e.g., California Coastal Cleanup Day History: Past Cleanup Data Results*, CALIFORNIA COASTAL COMMISSION, https://www.coastal.ca.gov/publiced/ccd/history.html (last visited June 6, 2023).

that work best for them and allow for implementing jurisdictions to customize their application to local circumstances and sources of plastic pollution.

As a key example, the California State Water Resources Control Board (State Water Board) adopted an Amendment to the Ocean Waters of California (Ocean Plan) to Control Trash and Part 1 Trash Provision of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries in 2015, referred to as the Trash Provisions.[150] The Trash Provisions prohibit discharge of trash larger than 5 millimeters to state waters from stormwater systems.[151] The Trash Provisions require Phase I and II permittees under the NPDES municipal separate storm sewer systems (MS4) permits to comply with the prohibition of discharge by installing, operating, and maintaining any combination of full capture systems, multi-benefit projects, other treatment controls, and/or institutional controls for all storm drains that capture trash from significant trash generating areas.[152] To qualify as a trash full capture system and satisfy the requirements of the Trash Provisions, a System installed after December 2, 2015, must be certified prior to installation. The State Water Board has issued application requirements and maintains a Certified Full Capture System List of Trash Treatment Control Devices.[153]

In addition, California has unique preproduction plastic discharge requirements and an implementation program for preproduction plastics, defined as plastic resin pellets and powdered coloring for plastics (also known as 'nurdles'), from point and nonpoint sources[154] that may be adopted in other states and regions with plastic manufacturing facilities to prevent the escape of preproduction plastics into the environment.

Finally, California Senate Bill 1422 added section 116376 to the Health and Safety Code in 2018, requiring the State Water Board to address microplastics in drinking water, including the adoption of a definition of microplastics in drinking water[155] and to adopt a standard methodology to be used in the testing of drinking water for microplastics and requirements for four years of testing and reporting of microplastics in drinking water, including public disclosure of those results. The California Safe Drinking Water Act also grants the State Water Board the authority to implement regulations that may include monitoring of contaminants. In September

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[150] STATE WATER RES. CONTROL BD, RES. NO. 2015-0019, AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR OCEAN WATERS OF CALIFORNIA TO CONTROL TRASH AND PART 1 TRASH PROVISIONS OF THE WATER QUALITY CONTROL PLAN FOR INLAND SURFACE WATERS, ENCLOSED BAYS, AND ESTUARIES OF CALIFORNIA.
[151] *Id.*
[152] *Id.*
[153] STATE WATER RES. CONTROL BD., CERTIFIED FULL CAPTURE SYSTEM LIST OF TRASH TREATMENT CONTROL DEVICES (Oct. 2022), https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/trash_implementation/certified_fcsdevicelist_16Feb2021.pdf.
[154] CAL. WAT. CODE § 13367 (Deering 2023).
[155] STATE WATER RES. CONTROL BD., RES. NO. 2020-0021: ADOPTION OF DEFINITION OF 'MICROPLASTICS IN DRINKING WATER (June 2020) ("'Microplastics in Drinking Water' are defined as solid polymeric materials to which chemical additives or other substances may have been added, which are particles which have at least three dimensions that are greater than 1 nm and less than 5,000 micrometers (µm). Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded.")

2022, the Water Board adopted a Policy Handbook[156] to establish a standard method for testing microplastics in drinking water and initiate a two-phase iterative approach to monitor microplastics in drinking water sources, including surface water.

Due to the nascent state of microplastics research and monitoring, few analytical laboratories provide adequate commercial monitoring services to support the State Water Board's regulations. To support the development of monitoring infrastructure, and ensure harmonized, accurate, and responsible reporting of data to consumers, the State Water Board manages several working groups as part of a subcommittee of the California Water Quality Monitoring Council. This subcommittee serves as a viable model for inter-sector and interstate collaboration to advance science, infrastructure, and understandings of microplastics monitoring.

The State of New Jersey's Plastics Advisory Council, in its first annual report, made a number of proposals for microplastic regulation. It urged the legislature to pass a bill to require microplastics monitoring and testing in drinking water.[157] It also supported investigation of further microplastics regulation. It suggested that New Jersey examine regulatory efforts from other jurisdictions, including California's Microplastic Strategy, Canada's Strategy on Zero Plastic Waste, and France's requirement that washing machines contain microplastic filters. The report also anticipated regulatory action by EPA, which could be used as a model for New Jersey.[158]

To support state and regional implementation of the federal Clean Water Act to effectively address plastic and micro/nanoplastic pollution, EPA should build upon existing state programs to develop and update technical guidance and tools, including the Trash Stormwater Permit Compendium.[159] EPA also should hold individual trainings and workshops and provide resources for states throughout the nation to implement and impose explicit permit requirements, including discharge prohibitions and regulatory limits where appropriate, to manage trash and microplastic debris.

II. EPA Should Coordinate and Expand Partnerships with the States to Build on Existing Efforts and Accelerate Consistent and Coordinated Plastics Research and Monitoring.

Effective management of plastics and microplastics begins with understanding the extent of plastic pollution on national, state, and local levels. This necessitates the development of consistent and coordinated plastics monitoring methods and programs. Consistent with the 2022

[156] STATE WATER RES. CONTROL BD., RESOLUTION NO. 2022-0032: ADOPTING A POLICY HANDBOOK ESTABLISHING A STANDARD METHOD OF TESTING AND REPORTING OF MICROPLASTICS IN DRINKING WATER (Sept. 2022).
[157] A. 4821/4823, 2022–23 Leg., Reg. Sess. (N.J. 2022).
[158] N.J. PLASTICS ADVISORY COUNCIL, *supra* note 42.
[159] U.S. EPA, TRASH STORMWATER PERMIT COMPENDIUM (Apr. 2021), https://www.epa.gov/system/files/documents/2021-09/ms4_trash_compendium_april-2021-with-pub-number_0.pdf.

National Academies Report[160] and Statewide Microplastics Strategy,[161] California has invested in the development and advancement of large plastic (via trash) and microplastics monitoring methods and is in the process of developing a phased, multi-year monitoring plan that is envisioned to provide guidance for coordinated and consistent plastics monitoring in California by federal, state, and local partners. Foundational plastics research and monitoring advancements and investments made in California that may support federal efforts include, but are not limited to:

(1) Trash Monitoring Methods and Assessment Playbook, which includes a suite of assessment methods to monitor State receiving waters for trash in 2020.[162]

(2) Microplastics Measurement Methods. Twenty-two laboratories in six different California counties participated in an interlaboratory study to assess microplastic measurement methods for accuracy, precision, and repeatability.[163] In September 2021, two standardized methods were released for the extraction and measurement of microplastics in drinking water: infrared spectroscopy[164] and Raman spectroscopy.[165] Laboratory accreditation was made available for these two methods in 2022.

(3) Microplastics Health Effects. A workshop series hosted by the Southern California Coastal Water Research Project Authority (SCCWRP), the San Francisco Estuary Institute (SFEI), and developed in coordination with the State Water Resources Control Board and OPC, brought together international experts to discuss thresholds at which biological effects are likely triggered in both humans and aquatic organisms at ambient concentrations. The workshop series resulted in a series of papers published as a collection in *Microplastics and Nanoplastics*[166] to inform microplastic risk assessments. Further, the California Department of Toxic Substances Control has proposed to add microplastics to its Candidate Chemicals List, which would allow it to evaluate consumer products that have microplastics or have the potential to release microplastics into the

[160] NAT'L ACADS., *supra* note 2, at 139–40 (see Tracking and Monitoring Systems for Ocean Plastic Waste: Findings 13 and 14, and Recommendations 2 and 3).
[161] CA Microplastics Strategy, *supra* note 40.
[162] SHELLY MOORE ET AL., SAN FRANCISCO ESTUARY INST. & S. CAL. COASTAL WATER RSCH. PROJECT, CALIFORNIA TRASH MONITORING METHODS AND ASSESSMENTS PLAYBOOK (2021), https://www.sfei.org/sites/default/files/biblio_files/Trash%20Monitoring%20Playbook%202021%20rev2.pdf.
[163] Hannah De Frond et al., *Monitoring microplastics in drinking water: An interlaboratory study to inform effective methods for quantifying and characterizing microplastics*, CHEMOSPHERE, 2022.
[164] STATE WATER RES. CONTROL BD., STANDARD OPERATING PROCEDURES FOR EXTRACTION AND MEASUREMENT BY INFRARED SPECTROSCOPY OF MICROPLASTIC PARTICLES IN DRINKING WATER (Sept. 24, 2021), https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/microplastics/mcrplstcs_ir.pdf.
[165] STATE WATER RES. CONTROL BD., STANDARD OPERATING PROCEDURES FOR EXTRACTION AND MEASUREMENT BY RAMAN SPECTROSCOPY OF MICROPLASTIC PARTICLES IN DRINKING WATER (Sept. 24, 2021), https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/microplastics/mcrplstcs_raman.pdf.
[166] Southern California Coastal Water Research Project, *SCCWRP workshop series*, SPRINGEROPEN (2022), https://www.springeropen.com/collections/sccwrp.

environment; and evaluate potential adverse health impacts on consumers, workers, and aquatic and terrestrial organisms from exposure to microplastics from those products.[167]

(4) Microplastic Field Sample Collection Method Standardization. California, through the OPC and State Water Resources Control Board, has initiated the evaluation and standardization of microplastic sample collection methods to evaluate and develop sample collection standard operating procedures (SOPs) for collecting field samples for microplastics in ambient water, stormwater, sediment, and biological tissues (e.g., fish, bivalves) to support environmental monitoring of microplastics.

As the federal government and the States continue to make plastic and microplastic research and monitoring investments, EPA should coordinate and expand partnerships with the States to build upon existing efforts, reduce redundancy, coordinate use of public funds, and accelerate efforts to advance consistent plastics research and monitoring nationwide.

III. EPA Should Take Swift Action to Address Known Microfiber Pollution Pathways While Also Investing in Further Research and Technology Development.

Microfibers—the tiny synthetic, semi-synthetic, and treated natural fibers released from clothing and other fiber based products—are one of the most pervasive and ubiquitous forms of microplastics in the environment.[168] The full range of health impacts to humans and other exposed biota are still being researched, but the prevalence of microfibers in the environment, their known and likely physical and chemical toxicity, and the potential for biomagnification up the food chain have caused global concern and demand a response.[169]

Decisive federal action on microfibers is needed alongside state initiatives[170] to address this pervasive and growing problem. Because microfibers are difficult, if not impossible, to remove once they enter the environment, EPA must take pollution prevention measures and pathway interventions to stop microfibers from entering the environment in the first place.[171] Without

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[167] CAL. DEPT. OF TOXIC SUBSTANCES CONTROL, PROPOSAL TO ADD MICROPLASTICS TO THE CANDIDATE CHEMICALS LIST: VIRTUAL PUBLIC WORKSHOP (Jun. 27, 2023), https://dtsc.ca.gov/wp-content/uploads/sites/31/2023/04/Background-Document-Proposal-to-Add-Microplastics-to-the-Candidate-Chemical-List_May272023.pdf.

[168] U.S. NOAA & EPA, INTERAGENCY MARINE DEBRIS COORDINATING COMMITTEE, REPORT ON MICROFIBER POLLUTION – 2022 REPORT TO CONGRESS: DRAFT FOR PUBLIC COMMENT 35–42 (Sept. 14, 2022) [hereinafter IMDCC Microfiber Report].

[169] *Id.* at 42.

[170] For example, California has adopted a Statewide Microplastics Strategy, which includes specific research and policy recommendations related to microfiber pollution. Additionally, the California legislature has considered multiple recent bills to address microfiber pollution, including a bill (AB 1628) now in committee that would require microfiber filters on washing machines sold in the state beginning in 2029. The Connecticut legislature passed Public Act 18-18120 in 2018 that established a multistakeholder working group to develop a consumer awareness and education program on microfiber pollution, which published its final report to the legislature in 2020.

[171] U.S. EPA, WHAT YOU SHOULD KNOW ABOUT MICROFIBER POLLUTION 1 (2020), https://www.epa.gov/sites/default/files/2020-07/documents/article_2_microfibers.pdf.

proactive measures, microfiber pollution will continue to compound; global fiber production is projected to rapidly grow under business as usual conditions.[172]

On May 8, 2023, a number of the States here sent a letter to EPA and NOAA, highlighting the issue of microfibers and requesting to commence a dialogue to collaboratively address this issue.[173] The Draft Strategy proposes to fund research of capture technologies such as those that can reduce microfiber discharges from washing machines (Sub-objective C2.2), and to support the development of management practices and technologies to remove microplastics (including microfibers) from effluent and waterways (Sub-objective C5.2). The States support these objectives. We add the following recommendations:

(1) Take decisive action now to achieve widespread adoption of washing machine microfiber filtration solutions**.** Washing machines are one of the most prominent and understood microfiber pollution pathways. When clothes are washed, they shed microfibers, which become suspended in washing machine wastewater. In the United States, this wastewater is generally transported to wastewater treatment plants that effectively filter out the vast majority of microfibers.[174] Microfibers that are filtered out in the treatment process are retained with biosolids, which are then applied to agricultural lands, landfilled, or incinerated. Microfibers that evade filtration are either released directly into waterways[175] or are contained in recycled wastewater that is used for irrigation or industrial purposes. A 2022 study analyzing the destination of microfibers in washing machine wastewater in California over a 12-year period found that 66 percent were applied to land via biosolids application or irrigation with recycled water, 5 percent entered waterbodies, 25 percent were landfilled, and 4 percent were incinerated.[176]

Because current wastewater management practices do not prevent microfibers from reentering the environment, but rather shift the locations where they are deposited, EPA must take more proactive measures to prevent microfiber pollution from entering wastewater in the first place. Fortunately, a variety of washing machine microfiber

[172] IMDCC Microfiber Report, *supra* note 168, at 1 ("In the last 20 years alone, global fiber production, both synthetic and natural, has more than doubled, reaching about 122 million tons (about 111 million metric tons) in 2019, and is expected to reach 161 million tons (146 million metric tons) in 2030 assuming business as usual conditions.").
[173] Letter from Connecticut Attorney General, et al., to Adm'r Michael S. Regan, U.S. EPA & Adm'r Richard W. Spinrad, U.S. NOAA, *Microfibers in our Nation's Waters* (May 8, 2023), https://stateimpactcenter.org/files/AGActions_microplastics-EPA-Letter-Final.pdf.
[174] U.S. EPA, *supra* note 171, at 2.
[175] Although only a small percentage of microfibers escape treatment plants, the immense quantity of microfibers in the system means that millions of microfibers could still be released into aquatic environments every day. In fact, an Ocean Wise study estimated that the U.S. and Canada together release 878 tons of microfibers into the environment through treated wastewater each year. OCEAN WISE, ME, MY CLOTHES AND THE OCEAN: THE ROLE OF TEXTILES IN MICROFIBER POLLUTION 3 (2019).
[176] Roland Geyer et al., *Quantity and fate of synthetic microfiber emissions from apparel washing in California and strategies for their reduction*, 298 ENV'T POLLUTION 1, 4 (2022).

filtration solutions are available now for domestic and commercial washers,[177] have been proven effective,[178] and are cost efficient.[179] For example, a pilot study in a small town in Canada installed microfiber filters on washing machines in nearly 100 homes and found a substantial reduction in microfibers after filter installation.[180] Solutions will only become more readily available and accessible in the next few years as producers respond to legislation around the world addressing microfiber pollution, including France's first-of-its-kind mandate that new washing machines have microfiber filters, effective January 1, 2025.[181]

EPA has a range of potential tools available to expedite the use of microfiber filtration solutions in U.S. washing machines. Pursuant to EPA's obligation under the Clean Water Act to protect our nation's waters, EPA must exercise its statutory authorities to prevent microfiber pollution and associated health and ecosystem impacts. Given the prominent flow of microfibers to and through wastewater treatment facilities, EPA should explore whether its national pretreatment program could be an effective tool to limit microfiber discharges from industrial washing machines.[182] Additionally, EPA should work with Congress to draft legislation mandating manufacturer installation of filtration systems on residential and commercial washing machines.[183] Until such legislation is passed, EPA should also direct federal grant funding toward widespread implementation of filtration systems.

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[177] Solutions fall into three categories: capturing devices, which are usually put into the drum of the machine; external filters, which are often installed on the water line; and internal filters, which are usually integrated into machines during manufacturing. These solutions are tailored depending on whether the washing machine is for domestic or commercial use, due to the machines' significant differences in water flow rate, frequency of use, and scale. *See, e.g.*, A PLASTIC PLANET, MATTER, PLANETCARE, XEROS TECHNOLOGIES & 5 GYRES INSTITUTE, FILTRATION AS AN EFFECTIVE AND NEAR-TERM SOLUTION TO REDUCE THE RELEASE OF MICROPLASTICS IN THE ENVIRONMENT 12–14 (Apr. 2023) (describing available solutions from Matter, PlanetCare, and Xeros Technologies); *Samsung Takes Sustainable Living to the Next Level at CES 2023*, SAMSUNG (Jan. 5, 2023), https://news.samsung.com/global/samsung-takes-sustainable-living-to-the-next-level-at-ces-2023 (describing Samsung's new Less Microfiber Cycle and Filter).

[178] Independent studies evaluating the efficacy of filtration solutions have found substantial microfiber capture: 26-90 percent depending on the product and methodology. *See* Imogen E. Napper et al., *The efficiency of devices intended to reduce microfibre release during clothes washing*, 738 SCI. TOTAL ENV'T, 2020.

[179] Prices range from about $35 to $250 for domestic washing machines depending on the type of technology; cost estimates for commercial solutions are less available because those solutions are customized.

[180] Lisa M. Erdle et al., *Washing Machine Filters Reduce Microfiber Emissions: Evidence From a Community-Scale Pilot in Parry Sound, Ontario*, 8 FRONTIERS IN MARINE SCI., 2021 (finding lint samples from the filters revealed weekly captures of 179,200 to 2,707,200 microfibers).

[181] Loi 2020-105 du 10 février 2020 relative à la lutte contre le gaspillage et à l'économie circulaire [Law 2020-105 of February 10, 2020 on Anti-Waste and Circular Economy], JOURNAL OFFICIEL DE LA RÉPUBLIQUE FRANÇAISE [J.O.] [OFFICIAL GAZETTE OF FRANCE], Feb. 10, 2020.

[182] The national pretreatment program is designed to prevent the introduction of pollutants to publicly owned treatment works that, among other problems, interfere with disposal of sludge or that pass through treatment into the environment. 40 C.F.R. § 403.3(s) (2023). As discussed above, microfibers do both: microfibers retained in biosolids threaten the ongoing feasibility of applying biosolids to agricultural lands; and microfibers that evade treatment are released into the environment and become nearly impossible to remove.

[183] For example, the 2021 version of the Break Free From Plastic Pollution Act (H.R. 2238, S.984, 117th Cong. (2021)) included a mandate that all washing machines sold in the United States have microfiber filters by 2025.

(2) Investigate the environmental justice and equity dimensions of microfiber pollution and prioritize addressing disproportionate impacts to tribes, people of color, and low-income communities. Insufficient attention has been paid to the environmental justice and equity impacts of microfiber pollution in both aquatic and terrestrial environments. Two areas for further research are discussed here, though many more likely exist and merit attention. First, marginalized communities likely bear disproportionate impacts from microfiber pollution in oceans and waterways. Biomagnification of microfibers in aquatic food webs puts people with seafood-dependent diets at heightened risk of physical hazards and toxic exposure from microfiber ingestion. As EPA recognized in its 2001 report on Fish Consumption and Environmental Justice, "communities of color, low-income communities, tribes, and other indigenous peoples depend on fish, aquatic plants, and wildlife . . . to a greater extent and in different ways than does the general population."[184] The demographic characteristics of subsistence fishers vary by waterbody, but many fish consumption studies have found that subsistence fishers are disproportionately low income and non-white, including tribes and other indigenous peoples.[185] Additionally, tribes and other indigenous peoples' use of aquatic species in ceremony, medicines, and other cultural and spiritual purposes may result in disparate exposure to microfiber pollution and associated health effects.[186] As EPA invests in additional research on the human health impacts of microfibers, particular attention should be paid to the unique risks these populations face. Such research should be done in consultation and collaboration with affected populations.

Second, terrestrial microfiber pollution likely also disproportionately impacts people of color and low-income communities. The application of biosolids on agricultural lands results in a net flow of microfibers from wealthier urban cores to lower income rural areas.[187] The resulting increased microfiber concentration in recipient communities poses risks of drinking water contamination, airborne pollution exposure, and soil degradation, though further research is needed to understand the full scope of environmental justice and equity implications of this transfer. To the extent that microfibers become airborne as biosolids dry out, farmworkers—who are disproportionately non-white, low-income, and

[184] NAT'L ENV'T JUSTICE ADVISORY COUNCIL, FISH CONSUMPTION AND ENVIRONMENTAL JUSTICE 2 (2002); *see also e.g.* MASS. DEP'T OF PUB. HEALTH, MASSACHUSETTS STATE HEALTH ASSESSMENT 80 (2017), https://www.mass.gov/doc/2017-massachusetts-state-healthassessment/download ("Greater health risks from consuming contaminated fish occur more often in EJ areas because residents often depend on locally caught fish as a regular part of their diet."); Susan L. Schantz et al., *Contaminant profiles in Southeast Asian immigrants consuming fish from polluted waters in northeastern Wisconsin*, 110 ENV'T RES. 33, 39–40 (2010) (finding elevated contaminant levels in Hmong communities in Green Bay, Wisconsin area due to consumption of locally caught contaminated fish); Joanna Burger et al., *Fishing in Urban New Jersey: Ethnicity Affects Information Sources, Perception, and Compliance*, 19 RISK ANALYSIS 217, 221–22, 225 (1999) (finding that Black and Hispanic urban fishers consumed greater proportion of self-caught fish and were less aware of fish consumption advisories and consumption risks than White fishers).
[185] NAT'L ENV'T JUSTICE ADVISORY COUNCIL, *supra* note 184, at 3–4.
[186] *Id.* at 4-10.
[187] Geyer et al., *supra* note 176, at 7.

non-citizen[188]—may face particularly acute risks of exposure. Additional demographic analysis of microfiber transfers is needed, and similar microfiber pollution mappings should be conducted across the country to better understand this problem on a national scale. If the use of biosolids is identified as an environmental justice concern, EPA should prioritize developing best management practices for the disposal of microfibers captured in wastewater treatment facilities that account for these impacts.

(3) Coordinate with state investments in research and technologies to address microfiber pollution from clothes dryers. EPA has the opportunity to become a global leader in advancing research on and solutions to microfiber pollution from clothes dryers. Although dryers have received less attention than washing machines, recent studies have identified dryer exhaust vents as a prominent pathway for microfiber pollution.[189] U.S. households play an outsized role in this pollution source. Approximately 80 percent of U.S. households of electric dryers, the vast majority of which are vented to the outdoors––directly release microfibers into the air.[190] With the exception of Canada, most other countries have substantially lower clothes dryer ownership and usage.[191] Moreover, ventless dryers are more popular in other markets, eliminating a direct pathway for microfiber air pollution.[192]

California has identified improving lint capture technology on household clothes dryers as another potential opportunity to intervene with microfibers and prevent these particles from becoming airborne in its Statewide Microplastics Strategy.[193] In partnership with California Sea Grant, the State of California has further committed to investing in microplastics research that improves understanding of aquatic microplastic contamination sources, including clothing dryers, with projects anticipated to begin October 2023.[194]

Additional opportunities to collaborate with the State of California include information-sharing regarding sector-specific recommendations to reduce microplastic and microfiber pollution from the textiles industry by building from previous state-federal workshops[195] to evaluate existing technologies, recommend advancements in in-home appliances,

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[188] *See,* e.g., CALIFORNIA RESEARCH BUREAU, FARMWORKERS IN CALIFORNIA: A BRIEF INTRODUCTION 1 (2013) (finding 92 percent of farmworkers in California are Latino, about 78 percent lack a high school diploma or equivalent, and roughly 73 percent of farmworker households earn less than 200 percent of poverty).
[189] IMDCC Microfiber Report, *supra* note 168, at 34.
[190] *Id.*
[191] Kristen J. Kapp & Rachael Z. Miller, *Electric clothes dryers: An underestimated source of microfiber pollution*, PLOS ONE, 2020.
[192] IMDCC Microfiber Report, *supra* note 168, at 34.
[193] CA Microplastics Strategy, *supra* note 40, at 17; *see also* Moran, K., Miller, et al., A SYNTHESIS OF MICROPLASTIC SOURCES AND PATHWAYS TO URBAN RUNOFF, SAN FRANCISCO ESTUARY INSTITUTE (2021) 1049.
[194] California Sea Grant & Ocean Protection Council, 2023 Microplastic Research Program: Request for Proposals, available at 2023 Microplastic Research Program: Request for Proposals | California Sea Grant (ucsd.edu).
[195] National Oceanic and Atmospheric Administration, California Microfiber Update: Textile Perspective - Proceedings of the 2020 California Microfiber Workshop (noaa.gov).

develop textile shedding standards, and identify solutions to reduce synthetic textile production and waste.[196]

Given the unique contributions of U.S. households' dryer usage to this microfiber pollution pathway, EPA is well-positioned to coordinate with existing state efforts and obligated to elevate new technologies and approaches by taking a global leadership role in understanding and addressing this source.

IV. EPA Should Address the Significant Microplastic Release from Tire Wear by Educating Consumers and Researching Technological and Policy Solutions.

Tires are worn down through abrasion on roadways while driving, shedding small particles of synthetic rubber and other materials onto the road surface and into the air.[197] Stormwater runoff and wind carry these microplastics from streets into the environment, polluting soil, rivers, lakes, and oceans.[198] This is particularly problematic because stormwater in the U.S. often flows through storm drains or directly into bodies of water without being treated.[199] One study estimates that tire wear particles are one of the top two sources of primary microplastics in the ocean.[200] The particles also contain toxic chemicals that leach into the environment and are dangerous for wildlife and possibly human health.[201] Further, the environments of communities

[196] CA Microplastics Strategy, *supra* note 40, at 13.
[197] Frank Sommer et al., *Tire Abrasion as a Major Source of Microplastics in the Environment*, 18 AEROSOL AND AIR QUALITY RSCH. 2014, 2015 (2018) (finding that tire abrasion is a significant source of microplastics in the environment by analyzing concentrations of tire wear particles in the air around two motorways and one federal highway).
[198] Rachel R. Leads & John E. Weinstein, *Occurrence of tire wear particles and other microplastics within the tributaries of the Charleston Harbor Estuary, South Carolina, U.S.A.*, 149 MARINE POLLUTION BULLETIN 569, 578 (2019) (finding that "[t]ire wear particles were the second most abundant particle type in the tributaries of Charleston Harbor"); Ida Järlskog et al., *Concentrations of tire wear microplastics and other traffic-derived non-exhaust particles in the road environment*, 170 ENV'T INT'L 1, 13 (2022) ("The findings from this study indicate that the stormwater system is an important transport route of [tire wear particles]," especially since road runoff is often not treated prior to release into the environment.).
[199] KELLY MORAN ET AL., SAN FRANCISCO ESTUARY INSTITUTE, A SYNTHESIS OF MICROPLASTIC SOURCES AND PATHWAYS TO URBAN RUNOFF 105 (2021) (describing that drain systems in California urban areas are typically separate from wastewater systems and that runoff flows directly to surface water without treatment).
[200] JULIEN BOUCHER & DAMIEN FRIOT, IUCN, PRIMARY MICROPLASTICS IN THE OCEANS: A GLOBAL EVALUATION OF SOURCES 21 (2017), https://holdnorgerent.no/wp-content/uploads/2020/03/IUCN-report-Primary-microplastics-in-the-oceans.pdf (estimating that 28.3 percent of primary microplastics in the ocean come from synthetic rubber tire wear, second to the laundry of synthetic textiles). Primary microplastics are "plastics directly released into the environment in the form of small particulates," including through abrasion of large plastics during manufacturing or use. *Id.* at 8. Secondary microplastics "originate from the degradation of larger plastic items into smaller plastic fragments once exposed to [the] marine environment." *Id.* at 8.
[201] Zhenyu Tian et al., *A ubiquitous tire rubber–derived chemical induces acute mortality in coho salmon*, 371 SCIENCE 185, 187–88 (2021) (finding that high concentrations of the toxic chemical 6PPD-quinone, a tire wear particle leachate, in creeks in the U.S. West Coast, were responsible for coho salmon mortality and stating that the "human health effects of such exposures [to tire chemicals] merit evaluation"); Markus Brinkmann et al., *Acute Toxicity of the Tire Rubber-Derived Chemical 6PPD-quinone to Four Fishes of Commercial, Cultural, and Ecological Importance*, 9 ENV'T SCI. TECH. LETTERS 333, 333 (2022) (confirming that both brook trout and rainbow trout are both also sensitive to 6PPD-quinone).

of color and low-income communities are at particular risk, as they are more likely to be located near high traffic roads.[202]

EPA should explicitly address this critical source of microplastics in its Strategy, especially because the United States is a top polluter. The average person in the United States releases an estimated 4.7 kg (10.36 lbs) of tire wear microplastics each year, higher than any other country because of our dependence on cars.[203] First, we recommend that EPA conduct or support further research on the feasibility of voluntary or policy solutions. Potential solutions identified by the San Francisco Estuary Institute that merit consideration include: (1) reformulating tire design to avoid using toxic chemicals and reduce abrasion, (2) installing tire wear collection mechanisms on vehicles, (3) using porous pavement to reduce runoff, and (4) installing runoff filtration systems, including rain gardens.[204] These technological solutions could eventually involve regulatory standards. Second, EPA should provide accessible educational materials to consumers that describe the problem, the least abrasive tire types to purchase, and actions individuals can take to reduce tire shedding, such as maintaining tire pressure, transitioning to long-life tires, and reducing their use of cars.[205]

STAGE 6:
WASTE IN THE OCEAN

EPA seeks feedback on whether the National Strategy should include sea-based sources of plastic waste.[206] EPA states that sea-based sources of plastic pollution are outside the scope of the Draft Strategy because the National Oceanic and Atmospheric Administration is the lead agency on marine debris.[207] However, to ensure that the federal response to the plastic pollution crisis is consistent, EPA's National Strategy should detail the ways in which all federal agencies will coordinate on responding to this crisis, including coordinated federal-state programs and investments to address sea-based sources of plastic pollution.

OTHER RECOMMENDATIONS

EPA Should Launch a National Consumer Education Campaign.

The States support Sub-objectives B5 (public education about plastic mismanagement), and C4 (public education about plastic impacts on waterways).[208] However, we recommend

[202] Gregory Rowangould, *A Census of the US Near-Roadway Population: Public Health and Environmental Justice Considerations*, 25 TRANSPORTATION RSCH. PART D: TRANSPORT AND ENV'T 59, 59 (2013).
[203] Pieter Jan Kole et al., *Wear and Tear of Tyres: A Stealthy Source of Microplastics in the Environment*, 14 INT'L J. ENV'T RSCH. PUB. HEALTH (2017) (noting that the estimated global per capita average is 0.81 kg/year).
[204] Moran et al., *supra* note 199, at 109–14. At least two companies are currently working on creating tire wear collection devices. GELBKO ENVIRONMENTAL VEHICLE SOLUTIONS, https://gelbko.com/ (last visited June 15, 2023); THE TYRE COLLECTIVE, https://www.thetyrecollective.com/ (last visited June 15, 2023).
[205] Moran, et al., *supra* note 199, at 109–14.
[206] DRAFT STRATEGY, *supra* note 5, at 3.
[207] *Id*. at 16.
[208] *Id.* at 28–29, 34.

including these Sub-objectives into a larger, coordinated, national consumer education campaign ("Campaign"), which includes a significant advertising component, akin to the Smokey the Bear Wildfire Prevention Campaign.[209]

For decades, the slogan "Reduce, Reuse, Recycle" has been hammered into our collective consciousness, with a particularly heavy emphasis on the third "R": recycling. Industry-run campaigns masterfully indoctrinated us to believing that we, the consumers, were responsible for preventing plastic pollution by recycling and not littering. If we placed our plastic waste into blue bins, we were saving the environment, and we could continue to buy more plastic products. If plastic waste continued to pile up in the environment, "irresponsible" consumers were to blame and not the corporations that oversaturated and overwhelmed a waste management system ill-equipped to handle the growing tidal wave of plastic.

The Campaign would be a societal reorientation—a systemic shift away from the current throw-away lifestyle and toward an equitable, circular future. In addition to educating the public about the impacts of plastic as set forth in Sub-objectives B5 and C4, the Campaign would encourage consuming fewer single-use products of any kind, normalize large-scale reuse systems including take-back programs, and embrace the National Labeling Standard described in Stage 2, Section III.

EPA should coordinate with the States and leverage their respective public messaging infrastructures for maximum exposure. To the extent necessary, EPA should work with Congress to ensure that the campaign is well-funded.

CONCLUSION

Plastic has invaded every aspect of our lives. For over half a century, we have chosen convenience at great cost to the environment and our health. Plastic production has gone unchecked since the birth of plastic. Overproduction has overwhelmed our ability to manage the resulting plastic waste, and the federal response to date has been inadequate because it has focused too heavily on cleanup and improving recycling. EPA has an opportunity to position the United States as a leader in responding to the plastic pollution crisis. But to do so, EPA must address every stage of the plastic waste life cycle including, importantly, reducing the production of plastic in the first place. The States are here to help.

Critically, the States provide an opportunity to serve as policy laboratories to trial innovative strategies, research and monitoring, and regulatory requirements to effectively prevent and address plastic pollution. We support the federal government's continued participation in international forums, including exploring possible Basel Convention ratification (Sub-objective B6) and ongoing negotiations for an international legally-binding plastics treaty.[210] We

[209] *Smokey's 70th Birthday: Wildfire Prevention*, OFF. OF COMMC'N, U.S. FOREST SERV. (Aug. 4, 2014), https://www.fs.usda.gov/features/story-smokey-bear (last visited Jun, 8, 2023).
[210] UNEP Env't Assembly Res. 5/14, End plastic pollution: toward an international legally binding instrument (Mar. 2, 2022),

encourage EPA and federal agencies to build from existing State efforts to develop clear and legally-binding plastic production reduction targets, to accelerate advancements in research, monitoring, and product design alternatives by sharing tools and information across international, federal, and state entities, and to ensure that the tools and strategies developed by the States are reflected in the final Strategy and are used to inform international efforts beyond U.S. borders.

The States appreciate the opportunity to comment on EPA's Draft National Strategy to Prevent Plastic Pollution and look forward to working with the federal government in responding to this global crisis.

Respectfully submitted,

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