Petition to the General Services Administration to Reduce and Eliminate Procurement and Acquisition of Single-Use Plastic Products

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Submitted by:

Center for Biological Diversity

Surfrider Foundation

Oceana

Friends of the Earth

Sierra Club

Peak Plastic Foundation

Beyond Plastics

The Story of Stuff Project

Healthy Gulf

Plastic Pollution Coalition

Ecology Center

5 Gyres Institute

Mission Blue

Waterkeeper Alliance

WildEarth Guardians

Sea Hugger

International Marine Mammal Project of Earth Island Institute

Endangered Habitats League

350NYC

Safer States

Russian Riverkeeper

Texas Campaign for the Environment

Society of Alternative Resources

Don't Waste Arizona

FracTracker Alliance

Zero Waste Humboldt

Greenpeace USA

Vote Climate

Coastal Band of the Chumash Nation

Turtle Island Restoration Network

Environment America

t.e.j.a.s.

Hispanic Access Foundation

GreenFaith

Fuerza Mundial Global

Cahaba Riverkeeper

Indivisible Bainbridge Island

Raptors Are The Solution

Oceanic Preservation Society

Plastic Free Future

Eco-Justice Collaborative

Rise St. James

The People's Justice Council

U.S. PIRG

Lonely Whale

Louisiana Bucket Brigade

Oceanic Global

Living Rivers & Colorado Riverkeeper

National Network for Immigrant and Refugee Rights

350 Seattle

San Antonio Bay Estuarine Waterkeeper

Resource Renewal Institute

CleanAirNow

Turtle Island Restoration Network

Save the Albatross Coalition

350 Bay Area

Cafeteria Culture

Utah Physicians for a Healthy Environment

Zero Waste Kauai

The Last Beach Cleanup

Bronx Jews for Climate Action

Interfaith EarthKeepers

Seneca Lake Guardian

Cooperative Energy Futures

The Bolsa Chica Land Trust

Heirs To Our Oceans

Sunflower Alliance

Upper West Side Recycling Center

ABCRGR Creation Collaborative

WESPAC Foundation, Inc.

The Last Plastic Straw

SAVE THE FROGS!

Great Egg Harbor Watershed Association

Zero Waste Washington

Syracuse Cultural Workers

South Shore Audubon Society

The River Project

Willamette Riverkeeper

Seatuck Environmental Association

MountainTrue

Catskill Mountainkeeper

Green Newton

Barrel Bag

For Love of Water (FLOW)

Spottswoode Winery, Inc.

inNative

Battle Creek Alliance/ Defiance Canyon Raptor Rescue

Conservation Congress

Animas Valley Institute

Bainbridge Island Zero Waste

Project Coyote

ColorBrightonGreen.org

Sustainable Mill Valley

Shark Stewards

Think Zero LLC

350 Colorado

Wild Nature Institute

Ciudadanos Del Karso

beachcleaner.de

Our Santa Fe River, Inc.

The Rewilding Institute

Berkshire Environmental Action Team (BEAT)

Seneca Lake Guardian

GBC Sustainability Team

Save The River Upper St. Lawrence Riverkeeper

Big Reuse

Newtown Creek Alliance

WATCH, INC

RESTORE: The North Woods

Ogeechee Riverkeeper

Project Management Review, Inc.

Concerned Health Professionals of New York

Drexel University

South Asian Fund For Education Scholarship and Training Inc. (SAFEST)

Alaska Community Action on Toxics

Kickapoo Peace Circle

Don't Waste Durham

Church Women United in New York State

Don't Gas the Meadowlands Coalition

Bag Free Wichita

RootsAction.org

In the Shadow of the Wolf

SocioEnergetics Foundation

Green Compass LLC

Active San Gabriel Valley

UU FaithAction NJ

r.Cup

Foundation Earth

North Carolina Council of Churches

Good Neighbor Steering Committee

Greenbelt Climate Action Network

Benicians for a Safe and Healthy Community

Winyah Rivers Alliance

Sustain Charlotte

St. Andrew's Presbyterian Church Earth Care Committee

Debris Free Oceans

Bhumi Global

Sustainable Wellesley

Animals Are Sentient Beings, Inc.

Institute for Local Self-Reliance

Christians For The Mountains

Earth Care Ministry, Second Presbyterian Church

Chautauqua-Conewango Consortium

Ban SUP

LPS Green Teams

Raritan Headwaters

Hannah4Change

Plastic Free Delaware

WasteCap

Presbyterian Climate Advocates

SLO Foam Free

Daily Acts

All Our Energy

BRINGiT For A Better Planet

Columbus Community Bill of Rights

Coalition for a Safe and Healthy CT

Save the Quiet Corner

Waste Free Greenwich

Apalachicola Riverkeeper

Nassau Hiking & Outdoor Club

ManaSota-88

Earth Ethics, Inc.

Heirs To Our Oceans

San Antonio Bay Estuarine Waterkeeper

Inland Ocean Coalition

Animal Welfare Institute

Milwaukee Riverkeeper

Friends of Buckingham

Fenceline Watch

Bay Area-System Change not Climate Change

Project Coyote

Courage California

FreshWater Accountability Project Ohio

UW-Stevens Point

BYOCT

BYO Madison

Tualatin Riverkeepers

Lexington Zero Waste Collaborative

Groton Conservation Advocates

Pittsburghers Against Single Use Plastics

350 New Orleans

Sustainable Upton

Environmental Action Committee of West Marin (EAC)

Friends of the San Juans

Clean Water Action CT

Connecticut Coalition for Environmental and Economic Justice

Zero Waste Ithaca

Pittsburgh Vegan Society

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I. Notice of Petition

Pursuant to section 553(e) of the Administrative Procedure Act, 5 U.S.C. §553(e) (APA), the undersigned organizations respectfully request that the Administrator of the General Services Administration (GSA) issue a rule committing the federal government to reducing and eventually eliminating its procurement and acquisition of single-use disposable plastic products. Such action is consistent with the agency's authorizing legislation, and necessary to address the serious threats to climate, health, safety, and biodiversity posed by plastic manufacturing and disposal. It is also in line with the Biden's administration's pledge to address both climate change and environmental justice.

The right of an interested party to petition a federal agency is a freedom guaranteed by the first amendment: "Congress shall make no law...abridging the...right of people...to petition the Government for redress of grievances."[1] Under the Administrative Procedure Act (APA), all interested persons have the right to petition for the "issuance, amendment, or repeal" of an agency rule.[2] A "rule" is the "whole or part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy."[3] The Petitioners exercise such rights to petition here. The GSA is required by law to respond to this petition in a timely manner.[4]

II. Executive Summary

The United States federal government is the single largest consumer in the world, spending more than $650 billion on products and services each year.[5] The GSA serves as the primary acquisition and procurement arm of the federal government. In its role regulating the procurement of equipment and supplies to federal agencies, it has the "opportunity to harness the power of the federal pocketbook to catalyze a more sustainable marketplace for all."[6]

One way the GSA can leverage its purchasing power to catalyze a more sustainable marketplace is to prohibit federal agencies from buying disposable, single-use plastic products. The world faces an indisputable plastic pollution crisis driven in large part by the use and disposal of single-use plastics. Nearly half of all plastic produced is made into disposable items that are discarded

[1] U.S. Const., Amend. I. *See also United Mine Workers v. Illinois State Bar Ass'n*, 389 U.S. 217, 222 (1967) (right to petition for redress of grievances is among most precious of liberties without which the government could erode rights).
[2] 5 U.S.C. § 553(e).
[3] 5 U.S.C. §551(4).
[4] 5 U.S.C. § 555(e) ("Prompt notice shall be given of the denial in whole or in part of a written application, petition, or other request of an interested person made in connection with any agency proceeding.").
[5] https://www.epa.gov/sustainable-marketplace-greener-products-and-services/buying-green-federal-purchasers
[6] *Id.*

within minutes of use.[7] These plastics cause serious environmental problems at every step of their lifecycle and are decidedly not "sustainable."

Plastic production fuels the climate crisis and damages local communities with toxic air and water pollution.[8] Once discarded, plastic clogs our rivers and oceans, harms wildlife, infiltrates our drinking water, and persists in the environment for centuries.[9] Plastic is also a threat to human health: as we increasingly consume more and more of our food and drinks from single-use plastic wrappers and containers, we're exposed to chemicals linked to many of the known public health crises of our time, including obesity, ADD/ADHD, and many forms of cancer.[10]

And despite false and misleading claims by the makers of plastics, we cannot recycle our way out of this problem. According to the Environmental Protection Agency, the U.S. plastic recycling rate is an anemic 8%.[11] Instead, more than 90% of plastics in the United States is buried, burned, or released into the environment.

Over 10 years ago President George W. Bush signed an executive order stating that it is the "policy of the United States that Federal agencies shall. . .leverage agency acquisitions to foster markets for sustainable technologies and environmentally preferable materials, products, and services."[12] The GSA can fulfill this political promise today. By altering its product specifications to mandate preference for reusable products rather than single-use plastics, the federal government could both significantly reduce the amount of plastic going to landfills and incinerators each year and spur demand for alternatives to single-use plastic products.

Just as President Biden recognized that "federal procurement is one of our most powerful tools to advance equity and build wealth in underserved communities,"[13] federal procurement can also reshape our environment and our health by reducing pollution and stemming the tide of single-use plastic entering our waste stream and contaminating our oceans, our wildlife, and our bodies.

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[7] Geyer et al., 2017. Production, use and fate of all plastics every made, *Science Advances* 3(7) , doi 10.1126/sciadv.1700782; *See also* https://www.unep.org/interactive/beat-plastic-pollution/

[8] *See, e.g.,* Center for International Environmental Law, *Fueling Plastics: Fossils, Plastics, and Petrochemical Feedstocks* (2017), https://www.ciel.org/wp-content/uploads/2017/09/Fueling-Plastics-Fossils-Plastics-Petrochemical-Feedstocks.pdf; Center for International Environmental Law, *Plastic & Health: The Hidden Costs of a Plastic Planet* (2019), https://www.ciel.org/plasticandhealth/.

[9] Gall, S.C. & R.C. Thompson, The Impact of Debris on Marine Life, 92 Marine Pollution Bull. 170 (2015); Koelmans, Albert A. et al., Microplastics in freshwaters and drinking water: Critical review and assessment of data quality, 155 Water Res 410 (2019); Andrady, Anthony L. "Persistence of plastic litter in the oceans." *Marine anthropogenic litter*. Springer, Cham, 2015. 57-72.

[10] Center for International Environmental Law, Plastic & Health: The Hidden Costs of a Plastic Planet (2019), https://www.ciel.org/plasticandhealth/.

[11] U.S. EPA; Plastics: Facts and Figures about Materials, Waste and Recycling; https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/plastics-material-specific-data.

[12] https://www.govinfo.gov/content/pkg/FR-2009-10-08/pdf/E9-24518.pdf

[13] https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/01/fact-sheet-biden-harris-administration-announces-new-actions-to-build-black-wealth-and-narrow-the-racial-wealth-gap/

III. Request for Rulemaking to End Federal Procurement and Acquisition of Single-Use Plastic Products

In furtherance of its stated policy to purchase sustainable products, and in line with its directive to procure environmentally preferable and nonhazardous products, the GSA must issue a rule committing the federal government to reduce and eventually eliminate its procurement and acquisition of single-use disposable plastic products.[14] This change is necessary to reduce the burden of single use plastic entering the nation's waste stream, and to protect human health and the environment. We cannot achieve the goal of environmental stewardship without leadership from the federal government.

Petitioners request that the GSA revise its regulations to reduce and eventually eliminate the acquisition of single-use plastic bags, single-use plastic utensils and straws, beverage bottles, packaging, and other single-use food service items and personal care products.[15] These revisions should apply to the procurement of single-use plastics for federal government meetings, conferences, and events; food service facilities in leased and custodial buildings; and supplies for federal government operations. In addition, the new regulations should apply to all manners by which civilian executive agencies acquire goods and services, directly or indirectly, including through lease, procurement, contracting, and purchase orders.[16]

We further request that the rulemaking contains exemptions for disability accommodations, disaster recovery, medical use, and personal protective equipment. GSA regulations must clarify that "single-use product" does not include medical products necessary for the protection of public health, or personal protective equipment including masks, gloves, or face shields.

IV. Legislative and Administrative Authority

1. Federal Acquisition Regulations

The General Services Administration is authorized by 40 U.S.C. § 501 to prescribe policies and methods governing the acquisition and supply of goods for Federal agencies.[17] This authority includes taking action "to the extent that the Administrator of General Services determines that the action is advantageous to the Federal Government in terms of economy, efficiency, or service."[18]

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[14] *See* FAR 23.703

[15] For example language, see the Break Free from Plastic Pollution Act of 2021, Part II, Sections 12201 and 12202.

[16] See Fisheries and Oceans Canada, Policy to Restrict the Procurement and Use of Single Use Plastic, https://buyandsell.gc.ca/cds/public/2019/05/23/cb8b98099e6784feec4484ae9ca21ef6/policy_procurement_single_use_plastic.pdf. This policy, enacted in 2019, applies to all single use products.

[17] 40 U.S.C. § 501(b); 48 CFR § 41.103; GSA has delegated to the Department of Defense the authority to enter into utility service contracts on behalf of the military departments.

[18] 40 U.S.C. § 501(a)(1)(A).

The GSA is required to purchase sustainable products and services under the Federal Acquisition Regulations (FAR) System Part 23.[19] The FAR is codified in Parts 1 through 53 of Title 48 of the Code of Federal Regulations, which generally governs acquisitions of goods and services by executive branch agencies. The FAR is the result of a 1979 statute directing the Office of Federal Procurement Policy (OFPP) within the Office of Management and Budget (OMB) to "issue polic[ies] … for the purpose of promoting the development and implementation of [a] uniform procurement system."[20] Partly in response to this directive, the FAR was issued in 1983, and took effect in 1984. It has been revised frequently since then, in response to legislation, executive orders, litigation, and policy considerations. One of the goals of the FAR, in setting standards for federal acquisition, is to "fulfill public policy objectives."[21]

The GSA issues additional regulations to guide acquisitions of goods and services for executive agencies not housed within the Department of Defense or NASA. The General Services Acquisition Regulation (GSAR) contains agency acquisition policies and practices, contract clauses, solicitation provisions, and forms that control the relationship between GSA and contractors and prospective contractors. GSAR 501.101. These regulations implement and supplement the FAR.[22] Both the FAR and GSAR therefore establish the requirements for purchasing supplies and services by civilian executive agencies.

The FAR mandates that federal agencies prioritize sustainable acquisitions. FAR 23.103.

> (a) Federal agencies shall advance sustainable acquisition by ensuring that 95 percent of new contract actions for the supply of products and for the acquisition of services (including construction) require that the products are-
>
> (1) Energy-efficient (ENERGY STAR® or Federal Energy Management Program (FEMP)-designated);
> (2) Water-efficient;
> (3) Biobased;
> (4) Environmentally preferable (e.g., EPEAT®-registered, or non-toxic or less toxic alternatives);
> (5) Non-ozone depleting; or
> (6) Made with recovered materials.

[19] 48 CFR Part 23.
[20] Office of Federal Procurement Policy Act Amendments of 1979, P.L. 93-400, §6(h), as amended by P.L. 96-83, §4(e), 93 Stat. 650 (Oct. 10, 1979). Additionally, "[t]he policy directives shall be followed by executive agencies." Id.
[21] FAR 1.102.
[22] See U.S. GSA, Acquisition Policy, "Acquisition Regulations" at https://www.gsa.gov/policy-regulations/policy/acquisition-policy/acquisition-regulations.

Specifically, Part 23.7 directs agencies to contract for environmentally preferable and energy-efficient products and services.[23] The FAR specifies that in contracting for environmentally preferable products and services, agencies must

> "Employ acquisition strategies that affirmatively implement the following environmental objectives:
> (1) *Maximize the utilization of environmentally preferable products and services*. . . .
> (3) *Eliminate or reduce the generation of hazardous waste and the need for special material processing* (including special handling, storage, treatment, and disposal). . . .
> (4) *Promote the use of nonhazardous* and recovered materials.. . . [and]
> (5) Realize life-cycle cost savings." 23.703 (emphasis added).

The GSAR does not speak directly to environmental purchasing beyond what is required in the FAR. Neither the FAR nor the GSAR have requirements specific to plastic items, except for a strict prohibition of the purchase of non-degradable plastic ring carriers. FAR Part 23.703(8).

2. The National Environmental Policy Act (NEPA), Section 102(1), and GSA Order ADM 1095.1F require GSA to consider the policies of NEPA, which include reducing hazardous waste and greenhouse emissions

Under ADM 1095.1F, the GSA, in all of its decision-making, "will attend carefully to the National Environmental Policy set forth in Section 101 of NEPA," and "[t]o the maximum extent practicable...will ensure that its actions protect and where possible improve the quality of the human environment, including the built and sociocultural environments of the nation's urban areas."

NEPA provides a longstanding umbrella for an emphasis on pollution prevention in all federal activities. One of the main purposes of NEPA, 43 U.S.C. § 4321 et seq., is to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." Section 101 of NEPA sets forth a clear statement of national goals and policies to protect and enhance the quality of our environment. Section 101 formally declares:

> "[I]t is the continuing responsibility of the Federal Government...to improve and coordinate Federal plans, functions, programs, and resources to...attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; [and to] enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

[23] *Id.* at §§ 23.101 - 23.105.

The text of § 101 imposes duties on federal agencies that requires them to "use all practicable means, consistent with other essential considerations of national policy," to achieve the broad policy goals set out in § 101(b). This leaves little doubt that Congress intended the Act to achieve a substantive result in furthering the protection and enhancement of our ecological resources. In fact, NEPA regulations further support the argument that Section 101 imposes a substantive duty on Federal agencies, stating that "[t]he President, the federal agencies, and the courts share responsibility for enforcing the Act so as to achieve the substantive requirements of Section 101."

NEPA's legislative history also supports the view that Congress envisioned a substantive reorientation of agency responsibilities. According to the Senate report, NEPA's broad policy provisions are a "body of law" which would determine the propriety of agency actions. Language in the conference report confirms this interpretation: "A statement of environmental policy is more than a statement of what we believe as a people and as a Nation. It established priorities and gives expression to our national goals and aspirations. It provides statutory foundation to which administrators may refer for guidance in making decisions…."[24]

Significantly, the phrase "to the fullest extent possible" in Section 102 means that each agency of the Federal Government shall comply with that section unless existing law applicable to the agency's operations expressly prohibits or makes compliance impossible.[25] Thus, the use of the phrase "to the fullest extent possible," appears to demonstrate congressional intent to affect a real shift in agency priorities.

Federal courts have enforced the interpretive and administrative force of NEPA § 102(1) through judicial review. In *Calvert Cliffs' Coordinating Committee, Inc. v. United States Atomic Energy Commission*,[26] Judge Skelly Wright held that Section 102(1) clearly implies a mandate that requires federal agencies to substantively consider environmental factors in their decision-making. He further held that an agency decision could be reversed on the merits if it could be "shown that the actual balance of costs and benefits that was struck was arbitrary or clearly gave insufficient weight to environmental values."[27] The Eighth Circuit followed in *Environmental Defense Fund, Inc. v. Corps of Engineers*.[28] The Court found that "NEPA was intended to effect substantive changes in decision making."[29] The Court also held that "courts have an obligation to

[24] U.S. Government Printing Office. Summary of Committee Activities in the 91st Congress. Hearings, Reports and Prints of the Senate Committee on Interior and Insular Affairs. (1972) at 7, available at https://play.google.com/books/reader?id=0RM2AAAAIAAJ&pg=GBS.PA12&hl=en.
[25] *Id.*
[26] *Calvert Cliffs' Coordinating Committee, Inc. v. United States Atomic Energy Commission*, 449 F.2d 1109 (D.C. Cir. 1971).
[27] *Id.* at 1115.
[28] *Environmental Defense Fund, Inc. v. Corps of Engineers*, 470 F.2d 289 (8th Cir. 1972).
[29] *Id.* at 297.

review substantive agency decisions on the merits."[30] This continuity in substantive NEPA review jurisprudence has been followed by decisions in many federal circuit and district courts.

Section 102(1) provides that organic statutes and legal authorities such as GSA's are to be interpreted and administered in accordance with the policies of NEPA, particularly when, as here, the price of making the correct environmental choice is cheaper than the dirtier, more polluting set of alternatives. *See, e.g., Center for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1166 ("The procedures prescribed both in NEPA and the implementing regulations are to be strictly interpreted 'to the fullest extent possible' in accord with the policies embodied in the Act 42 U.S.C. 4332(1)"); Harvey Bartlett, *Is NEPA Substantive Review Extinct, or Merely Hibernating? Resurrecting NEPA Section 102(1)*, 13 Tul. Env't L.J. 411 (2000).

Under the Final Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, agencies must consider climate change in relation to a proposed agency action.[31] With this new guidance comes the need for agencies to consider how to address greenhouse gas emissions stemming from Federal actions. GSA is not exempt from this new guidance, and as a result, should consider the impact of greenhouse gas emissions stemming from single-use plastic production. In light of these provisions, the GSA should revise its traditional procurement regulations to ensure that they comply with NEPA's environmental objectives.

3. Executive Order 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

President Joe Biden on his first day in office, January 21, 2021, issued the Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.[32] The EO clarifies that it is the policy of the Biden Administration to

> "improve public health and protect our environment; to ensure access to clean air and water; to limit exposure to dangerous chemicals and pesticides; to hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; to reduce greenhouse gas emissions; to bolster resilience to the impacts of climate change; to restore and expand our national treasures and monuments; and to prioritize both environmental justice and the creation of well-paying union jobs necessary to deliver on these goals."

[30] *Id.* at 298.
[31] Council on Environmental Quality, 2016, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, available at https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf
[32] Exec. Order No. 13990, 86 Fed. Reg. 7037 (January 21, 2021).

Consistent with this policy, the EO directs the GSA, and all executive agencies, to immediately commence work to advance environmental justice and confront the climate crisis. The GSA can begin to confront the legacy of plastic pollution, and its associated greenhouse gas emissions, toxic pollution, and disproportionate harm to low-income communities of color, by initiating a rulemaking to reduce and eventually eliminate single-use plastic procurement and use. This action comports with the Biden administration's stated policy in EO 13990 and will result in cleaner and healthier communities and environments.

4. Executive Order 14057: Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability

On December 8, 2021, President Biden recognized the power the federal government holds in catalyzing environmental change.[33] "As the single largest land owner, energy consumer, and employer in the Nation, the Federal Government can catalyze private sector investment and expand the economy and American industry by transforming how we build, buy, and manage electricity, vehicles, buildings, and other operations to be clean and sustainable."

Several sections of the EO specifically identify federal procurement as an area where the federal government can lead. First, to reduce waste and pollution, Section 207 demands that "[e]ach agency shall minimize waste, including the generation of wastes requiring treatment and disposal; advance pollution prevention; support markets for recycled products; and promote a transition to a circular economy," among other things. Regarding sustainable acquisition and procurement, Section 208 states that

> "[a]gencies shall reduce emissions, promote environmental stewardship, support resilient supply chains, drive innovation, and *incentivize markets for sustainable products and services by prioritizing products that can be reused*, refurbished, or recycled; maximizing environmental benefits and cost savings through use of full lifecycle cost methodologies; purchasing products that contain recycled content, are biobased, or are energy and water efficient, in accordance with relevant statutory requirements; and, to the maximum extent practicable, purchasing sustainable products and services identified or recommended by the Environmental Protection Agency (EPA)." (emphasis added).

Finally, Section 301 mandates that agencies "shall pursue procurement strategies to reduce contractor emissions and embodied emissions in products acquired or used in Federal projects."

Reducing and eventually eliminating the procurement and use of single-use plastic products by federal agencies will further all of those mandates. Transitioning to procurement of reusable

[33] Exec. Order No. 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, 86 Fed. Reg. 70935 (Dec. 8, 2021).

items rather than single-use plastic products will catalyze a market for reusable alternatives, promote the transition to a circular economy, and reduce greenhouse emissions.

V. Reasons for Petition

1. *Single-Use Plastics Are Harmful to Human Health and the Environment*

The world is awash in single-use disposable plastic — with severe environmental consequences. Around the world, one million plastic drinking bottles are purchased every minute, while 5 trillion single-use plastic bags are used worldwide every year. In total, almost half of all plastic produced is designed to be used only once — and then thrown away.[34]

Plastic waste is now so ubiquitous in the natural environment that scientists have even suggested it could serve as a geological indicator of the Anthropocene era.[35] Plastic harms human health and the environment at every stage of its lifecycle, from production to disposal.

The goals of the FAR, in setting standards for federal acquisition, are to "maximize the utilization of environmentally preferable products" and to "fulfill public policy objectives."[36] President Biden has stated that it is the policy of his Administration "to improve public human health and protect the environment. . . to limit exposure to dangerous chemicals . . . to reduce greenhouse gas emissions . . . [and] to prioritize []environmental justice."[37] A requirement reducing plastic procurement by the federal government is consistent with these goals and will advance public policy objectives.

a. Human Health Impacts from Plastics

Humans are exposed to a large variety of toxic chemicals through inhalation, ingestion, and direct skin contact at every stage of the plastic life cycle. From extraction of fossil fuels and plastic production, to consumer use, disposal and beyond, the risks to human health are wide-ranging and alarming.

i. Plastic Production

99% of plastics are produced from chemicals derived from oil, natural gas and coal — all of which are dirty, non-renewable resources.[38] Petrochemical companies continue to locate new and expanded plastics facilities near existing fossil fuel infrastructure, which means they are targeting the Gulf Coast, Appalachia, the Ohio River Valley, and other communities that already

[34] United Nations Environment Program; https://www.unep.org/interactive/beat-plastic-pollution/
[35] *Id.*
[36] FAR 23.702, 1.102.
[37] Executive Order 13990, 86 Fed. Reg. 7037 (January 20, 2021), "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis."
[38] Center for International Environmental Law, Plastic and Health: The Hidden Cost of a Plastic Planet, https://www.ciel.org/wp-content/uploads/2019/02/Plastic-and-Health-The-Hidden-Costs-of-a-Plastic-Planet-February-2019.pdf

shoulder a heavy burden of oil, gas, and plastic industry pollution. Across the United States, these facilities are often located in and have a disproportionate impact on low-income and minority neighborhoods. The harms from plastic production, including extraction and refining, are wide ranging.

The Center for International Environmental Law published a report in 2019 on the health impacts associated with plastic at every stage of its supply chain and lifecycle.[39] Extensively researched, the reports contained over 450 references to scientific articles on the impacts of plastics to human health. Included in this section are some of the highlights regarding its findings on human health and plastic production.

The plastic products federal agencies procure begin their lifecycle as fossil fuels and so must the evaluation of their environmental impacts. The extraction of oil and gas, particularly hydraulic fracturing for natural gas, releases an array of toxic substances into the air and water, often in significant volumes. Over 170 fracking chemicals that are used to produce the main feedstocks for plastic have known human health impacts, including cancer, neurological, reproductive, and developmental toxicity, impairment of the immune system, and more. These toxins have direct and documented impacts on skin, eyes, and other sensory organs, the respiratory, nervous, and gastrointestinal systems, liver, and brain.[40]

In the United States alone, an estimated 12.6 million people live within a half-mile of oil and gas facilities.[41] Research continues to show that oil and gas development creates air pollution, including during production, processing, transmission, and storage.[42] Between 2009 and 2015, 685 peer reviewed studies investigated the impacts of fracking. Of the 46 studies on air quality, 87 percent indicated elevated air pollution emissions.

Harmful pollutants emitted from oil and gas operations can impact the respiratory, circulatory, reproductive, immune, neurological, and digestive systems, in addition to the skin and eyes.[43] Unlike immediate impacts to the skin and eyes that can occur upon contact, other health impacts that are not always evident at the time of exposure can have unpredictable and delayed life-long effects on individuals and their offspring.[44] Of the 353 chemicals associated with oil and gas

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[39] *Id.*
[40] *See* U.S. Envtl. Prot. Agency, Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States, Executive Summary (2016), https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_ executive_summary.pdf.
[41] The Oil & Gas Threat Map, https:// oilandgasthreatmap.com (last visited Jan. 31, 2019).
[42] U.S. Envtl. Prot. Agency, GHGRP Petroleum and Natural Gas Systems, https://www.epa.gov/ghgreporting/ghgrp-petroleum-and-naturalgas-systems (last updated Oct. 17, 2018).
[43] See Seth B.C. Shonkoff, Jake Hays, & Madelon L. Finkel, Environmental Public Health Dimensions of Shale and Tight Gas Development, 122(8) Envtl. Health Perspectives 787, 787-95 (2014), https://ehp.niehs.nih.gov/doi/10.1289/ ehp.1307866.
[44] Theo Colborn et al., Hazard Assessment Articles: Natural Gas Operations from a Public Health Perspective, 17(5) Hum. & Ecological Risk Assessment: An Int'l J. 1039, 1039-56 (2011), available at https://www.biologicaldiversity.org/campaigns/fracking/ pdfs/Colborn_2011_Natural_Gas_from_a_public_health_perspective.pdf.

production, 75 percent affect the skin, eyes, and other sensory organs, the respiratory system, the gastrointestinal system, and the liver. Up to half of the chemicals could affect the brain/nervous system, immune and cardiovascular system, and the kidneys.[45]

Studies show that the health risks of vulnerable populations such as children, infants, and pregnant women are particularly high in regions with expansive oil and gas production.[46] Oil and gas drilling and fracking operations use and emit chemicals that are known to disrupt the endocrine system, the collection of glands that produces hormones and regulates everything from hunger to reproduction and influences nearly every cell, organ, and metabolic function.[47] Endocrine disruptors are chemicals that can interfere with the body's endocrine system and negatively impact the developmental, reproductive, neurological, and immune systems. Research links endocrine disruptors to cancer, obesity, diabetes, metabolic diseases, infertility, and increased risk during prenatal and early infant development when organ and neural systems are forming.[48] Thirty seven percent of the chemicals used in fracking are suspected endocrine disruptors.[49]

Harmful chemicals used in fracking can enter drinking water resources—from spills, improper handling of wastewater, or faulty infrastructure— and lead to negative impacts on human health. Forty of 58 peer-reviewed studies of water quality near oil and gas production sites (69 percent) show evidence of water contamination associated with oil and gas production.[50] In just four US states—Colorado, New Mexico, North Dakota, and Pennsylvania—6,648 fracking-related spills were recorded from 2005-2014.[51]

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[45] *Id.*
[46] *See* Concerned Health Professionals of N.Y. & Physicians for Social Responsibility, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Oil & Gas Extraction) (5th ed. Mar. 2018), https://www.psr.org/ wp-content/uploads/2018/04/Fracking_ Science_Compendium_5.pdf.
[47] Kim Ann Zimmerman, Endocrine System: Facts, Functions and Diseases (Feb. 15, 2018, 8:50 PM), https://www.livescience.com/26496- endocrine-system.html
[48] Nat'l Inst. of Envtl. Health Sciences, Endocrine Disruptors, https://www.niehs.nih. gov/health/topics/agents/endocrine/index.cfm (last reviewed Jan. 22, 2019); see also See Christopher D. Kassotis et al., EndocrineDisrupting Chemicals and Oil and Natural Gas Operations: Potential Environmental Contamination and Recommendations to Assess Complex Environmental Mixtures, 124(3) Envtl. Health Perspectives 256, 256-64 (2015), https://ehp.niehs.nih.gov/doi/10.1289/ ehp.1409535.
[49] *See* Theo Colborn et al., Hazard Assessment Articles: Natural Gas Operations from a Public Health Perspective, 17(5) Hum. & Ecological Risk Assessment: An Int'l J. 1039, 1039-56 (2011), available at https://www. biologicaldiversity.org/campaigns/fracking/ pdfs/Colborn_2011_Natural_Gas_from_a_ public_health_perspective.pdf. *See also* Ashley L. Bolden et al., Exploring the endocrine activity of air pollutants associated with unconventional oil and gas drilling, 17(26) Envtl. Health (2018), https://ehjournal. biomedcentral.com/track/pdf/10.1186/ s12940-018-0368-z.
[50] *See* Jake Hays & Seth B.C. Shonkoff, Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015, 11(4) PLoS ONE (2016), https://doi. org/10.1371/journal.pone.0154164.
[51] Brooks Hays, Study finds 6,600 oil spills in four states over ten years, UPI Science News (Feb. 21, 2017, 11:15 AM), https://www.upi.com/ Science_News/2017/02/21/Study-finds-6600- fracking-spills-in-four-states-over-10-years/ 5611487691909.

Once extracted, transforming fossil fuel into plastic resins and additives releases carcinogenic and other highly toxic substances into the air and water. In particular, fenceline communities located in close proximity to production sites and workers employed in the production facilities are acutely impacted. These communities face daily exposure to a variety of toxic chemicals at much higher levels than communities located far from industrial sites. Additionally, they are at constant risk of increased exposure from incidents and accidents, a risk that grows as the number of industrial plants for plastic production, and associated industries, grows. Documented effects of exposure to these substances include impairment of the nervous system, reproductive and developmental problems, cancer, leukemia, and genetic impacts like low birth weight. Industry workers and communities neighboring refining facilities are at greatest risk and face both chronic and acute exposures during uncontrolled releases and emergencies.

Many of the chemicals integral to producing plastic are hazardous air pollutants. For example, a report by the Union of Concerned Scientists (UCS) reviewed the most dangerous hazardous air pollutants present daily in the Houston, Texas, community of Manchester.[52] Four of the six pollutants examined are related to plastic production: 1,3 butadiene, benzene, styrene, and toluene. Many of these chemicals, as well as others released through the production of plastic, pose an especially serious threat to human health because they have a variety of impacts, including cancer, and can be difficult to detect, as some are colorless and tend to have mild to no odor.

Plastics facilities also pollute the water and jeopardize human health in the areas where they are sited. The processes that turn fossil fuels into plastic produce numerous chemical wastewater byproducts, many of which are toxic to humans and wildlife.[53] A number of these chemicals are so hazardous that they never should be released into the environment. Yet the permits issued to petro-plastics operations allow just that—the discharge of liquid waste streams laden with myriad hazardous chemical compounds into our rivers, streams, and oceans. In humans, these compounds are known to cause various cancers; damage DNA; increase inflammation; induce reproductive harms, including fatal embryonic malformations; disrupt hormone systems; and/or damage key organs, including the brain, liver, and kidneys. In nonhuman animals—including invertebrates, fish, amphibians, reptiles, birds, and mammals— chemical exposure leads to many of the same problems: impaired reproduction, DNA damage, liver disorders, altered blood chemistry, immune deficiency, cancers, and death.

Petrochemical companies continue to locate new and expanded plastics facilities near existing fossil fuel infrastructure, which means they are targeting communities that already shoulder a heavy burden of oil, gas, and plastic industry pollution. Across the United States, these facilities are often located in and have a disproportionate impact on low-income and minority

[52] Union of Concerned Scientists 2016, Double Jeopardy in Houston; Acute and Chronic Chemical Exposures Pose Disproportionate Risks for Marginalized Communities.
[53] Siemens 2007; Environmental Law Institute 2018.

neighborhoods. President Biden has emphasized his commitment to environmental justice again and again. In taking steps to ensure federal procurement is not contributing to the epidemic of plastic production and pollution, the GSA can prevent harm to human health and the environment while furthering the president's stated goal of "advance[ing] equity . . . in underserved communities."

ii. Plastic Use and Disposal

As a result of the global shift from reusable to single-use packaging (including containers), the most significant market for plastic today is packaging and comprises 42 percent of all plastic ever produced.[54] Packaging is also the product with the shortest lifespan. Most plastic packaging leaves the economy the same year it is produced because most of it is designed for a single use.[55]

When considering the human health impacts of plastic, there is a distinction between the impacts of plastic particles (micro- and nanoplastic particles) entering the human body and the impacts of the chemical additives, plasticizers, and contaminants associated with plastic particles. To date, most of the research on the impacts of micro- and nanoplastic particles has focused on impacts to marine life, while their impacts on human health have received much less attention. There is emerging data demonstrating the presence of micro- and nanoparticles of plastic (including toxic chemical additives) in the food we eat, air we breathe, and water we drink, raising concerns among scientists about their potential impacts on human health. Though our understanding of the impacts of micro- and nanoparticles of plastic on human health is limited, the emerging body of research is raising fundamental questions about the historic belief that plastic is inert and safe.

A wide array of chemicals and additives may be used in the manufacturing process to create a polymer, including initiators, catalysts, and solvents.[56] Additional chemical additives are used to provide various characteristics including stabilizers, plasticizers, flame retardants, pigments, and fillers. They can also be used to inhibit photodegradation, to increase strength, rigidity, and flexibility, or to prevent microbial growth.[57] Most of these additives are not bound to the polymer matrix and easily leach out of the polymer into the surrounding environment, including air, water, food, or body tissues.[58] As plastic particles continue to degrade, new surface area is exposed, allowing continued leaching of additives from the core to the surface of the particle.[59]

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[54] See Roland Geyer, Jenna R. Jambeck & Kara Lavender Law, Production, Use and Fate of All Plastics Ever Made, 3(7) Sci. Advances 1 (2017)
[55] World Economic Forum (WEF), Industry Agenda, The New Plastics Economy: Rethinking the future of plastics 12 (2016).
[56] See Tamara S. Galloway, Micro- and Nanoplastics and Human Health, in Marine Anthropogenic Litter (Melanie Bergmann et al. eds., 2015)
[57] *See* Stephanie L. Wright & Frank J. Kelly, Plastic and Human Health: A Micro Issue?, 51(12) Envtl. Sci. & Tech. 6634, 6634-47 (2017), https://pubs. acs.org/doi/10.1021/acs.est.7b00423.
[58] *See* Tamara S. Galloway, Micro- and Nanoplastics and Human Health, in Marine Anthropogenic Litter (Melanie Bergmann et al. eds., 2015)
[59] See Stephanie L. Wright & Frank J. Kelly, Plastic and Human Health: A Micro Issue?, 51(12) Envtl. Sci. & Tech. 6634, 6634-47 (2017), https://pubs. acs.org/doi/10.1021/acs.est.7b00423.

In 2018, a study from the Medical University of Vienna and the Environment Agency of Austria analyzed stool samples from participants across Finland, Italy, Japan, the Netherlands, Poland, Russia, the United Kingdom, and Austria. Every sample tested positive for the presence of microplastics and up to nine different types of plastic resins were detected. On average, the researchers found 20 microplastic particles per 10g of stool. The study demonstrated that plastic reaches the human gut and that all food chains are likely contaminated.[60]

Use of plastic products leads to ingestion and/or inhalation of large amounts of both microplastic particles and hundreds of toxic substances with known or suspected carcinogenic, developmental, or endocrine-disrupting impacts.

Migration of chemicals from food packaging into food and beverages is considered the main source of human exposure to contaminants associated with plastic use.[61] Some plastic polymers used for food contact degrade when they come into contact with acidic or alkaline foods, UV light, and heat. Toxic monomers like styrene are released in these conditions.[62] Plastic additives are a diverse group of substances fulfilling various functions. Since they are often not tightly bound to the material, they are another common source of chemicals leaching into food.

Only a handful of the thousands of chemicals used as additives in food packaging have undergone rigorous testing.[63] At least 175 chemicals that are known to be hazardous (i.e., endocrine disruptors, reproductive toxins, mutagens, or carcinogens) are used in food contact materials in the US and the European Union (EU).[64] Of the 4,000 chemicals approved in the US to be intentionally added in food packaging, only about 1,000 of them have been evaluated for health risks, and even then in a very limited way.

In addition to a lack of testing on most food packaging chemicals and plastic additives, there is little research to shed light on the effects of cumulative exposures from multiple sources. However, a large body of research has demonstrated that chemicals migrate into food from

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[60] *See* Philipp Schwabl et al., Assessment of microplastic concentrations in human stool – Preliminary Results of A Prospective Study, 6 United Eur. Gastoenterology J. Supplement 1 (2019) (presented at UEG Week 2018), https:// www.ueg.eu/education/document/assessmentof-microplastic-concentrations-in-human-stoolpreliminary-results-of-a-prospectivestudy/180360.

[61] *See* Koni Grob et al., Food Contamination with Organic Materials in Perspective: Packaging Materials as the Largest and Least Controlled Source? A View Focusing on the European Situation, 46(7) Critical Rev. in Food Sci. & Nutrition 529, 529-36 (2006), https://www.ncbi. nlm.nih.gov/pubmed/16954061; Galloway, supra note 9.

[62] *See* World Health Organization (WHO), Persistent Organic Pollutants: Impact on Child Health (2010) https://apps.who.int/iris/ bitstream/handle/10665/44525/9789241501101_ eng.pdf?sequence=1.

[63] *See* Luz Claudio, Our Food: Packaging and Public Health, 120(6) Envtl. Health Persp. a232, a232-a237 (2012), https://www.ncbi.nlm.nih. gov/pmc/articles/PMC3385451; see also, Thomas G. Neltner et al., Data gaps in toxicity testing of chemicals allowed in food in the United States, 42 Reprod. Toxicology 85, 95-94 (2013), https://www.ncbi.nlm.nih.gov/ pubmed/23954440.

[64] *See* Birgit Geueke, Charlotte C. Wagner & Jane Muncke, Food contact substances and chemicals of concern: A comparison of inventories, 31(8) Food Additives & Contaminants – Part A Chemistry, Analysis, Control, Exposure & Risk Assessment 1438, 1443 (2014), https://www. ncbi.nlm.nih.gov/pubmed/24999917.

packaging. For example, styrene and other toxic chemicals found in polystyrene have been identified in foods that come packaged in it and in human blood and urine.[65]

Microplastic also contaminates drinking water supplies. Scientists have only recently studied plastic pollution in freshwater, but it is now documented in groundwater[66], and it is at least as ubiquitous in rivers and streams as it is in marine environments.[67] For example, a scientist recently swam the length of the Tennessee River—the drinking water source for 4.7 million people—and found one of the highest concentrations of microplastics in the world.[68]

Recent studies have also found microplastics at the outflows of drinking water treatment facilities, and in tap water, bottled water, and even domestic beer.[69] The first study that looked at microplastics in bottled water found concentrations as high as 10,000 plastic pieces per litre of water, with only 17 of 259 bottles testing free of microplastics.[70]

All plastic waste management technologies (including incineration, co-incineration, gasification, and pyrolysis) result in the release of toxic metals, such as lead and mercury, organic substances (dioxins and furans), acid gases, PAHs, VOCs, and other POPs, including polychlorinated dibenzofurans (PCDF), PCBs, and hexachlorobenzene (HCB),[71] acid gases (including sulphur dioxide and hydrogen chloride), particulates (dust and grit), nitrogen oxides, carbon monoxide, and and other toxic substances to the air, water, and soils.[72] All such technologies lead to direct and indirect exposure to toxic substances for workers and nearby communities, including

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[65] Capella KM, Roland K, Geldner N, *et al.* (2019) Ethylbenzene and styrene exposure in the United States based on urinary mandelic acid and phenylglyoxylic acid: NHANES 2005–2006 and 2011–2012. *Environmental Research* 171: 101–110. doi: 10.1016/j.envres.2019.01.018; Hahladakis JN, Velis CA, Weber R, Iacovidou E and Purnell P (2018) An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling. *Journal of Hazardous Materials* 344: 179–199. doi: 10.1016/j.jhazmat.2017.10.014

[66] Samuel Panno, et al., Microplastic Contamination in Karst Groundwater Systems 57(2) 189-196 (2019), https://doi.org/10.1111/gwat.12862

[67] Koelmans, Albert A. et al., Microplastics in freshwaters and drinking water: Critical review and assessment of data quality, 155 Water Res 410 (2019); McCormick, Amanda R. et al., Microplastic in surface waters of urban rivers: concentration, sources, and associated bacterial assemblages, 7(11) Ecosphere e01556 (2016).

[68] Tennessee Aquarium, A Plastic Pandemic - German Scientist's Analysis Finds Staggering Levels of Microplastic Pollution in Tennessee River (Oct. 18, 2018), https://www.tnaqua.org/newsroom/entry/a-plastic-pandemic-german-scientists-analysis-findsstaggering-levels-of-microplastic-pollution-in-tennessee-river.

[69] Eerkes-Medrano et al. 2019; Koelmans et al. 2019; Kosuth et al. 2018; Pivokonsky et al. 2018; Novotna et al. 2019

[70] Kosuth, Mary et al., Anthropogenic contamination of tap water, beer, and sea salt, 13(4) PLoS ONE e0194970 (2018).

[71] *See* UNEP, Guidelines on Best Available Techniques and Provisional Guidance on Best Environmental Practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants (2007), http://chm.pops.int/Portals/0/download.aspx?d=UNEPPOPS-BATBEP-GUID-GUIDELINES-All.En.pdf [hereinafter UNEP Guidelines on Art. 5 & Annex C of POPS Convention].

[72] *See* UNEP, Solid Waste Management: Sound practices – Incineration, http://www.unep.or.jp/ietc/ESTdir/Pub/MSW/sp/SP5/SP5_4.asp (last visited Feb. 1, 2019); Bell L and Takada PH (2021) PLASTIC WASTE MANAGEMENT HAZARDS. International Pollutants Elimination Network (IPEN). 114p. https://ipen.org/documents/plastic-waste-management-hazards-waste-energy-chemical-recycling-and-plastic-fuels

through inhalation of contaminated air, direct contact with contaminated soil or water, and ingestion of foods that were grown in an environment polluted with these substances.

Smoke and particulates emitted from burning plastic and other waste can trigger respiratory health problems, particularly among children, the elderly, people with asthma, and those with chronic heart or lung disease,[73] while PCDF and PCBs are known carcinogens and emitted metals are known neurotoxins. The toxins from emissions, fly ash, and bottom ash in the burn pile can travel long distances and deposit on soil and water, eventually entering human bodies after being accumulated in the tissues of plants and animals in the food chain.[74]

Once plastic reaches the environment in the form of macro- or microplastics, it contaminates and accumulates in food chains through agricultural soils, terrestrial and aquatic food chains, and the water supply. This plastic can easily leach toxic additives or concentrate toxins already in the environment, making them bioavailable again for direct or indirect human exposure. As plastic particles degrade, new surface areas are exposed, allowing continued leaching of additives from the core to the surface of the particle in the environment and the human body.

Marine species from plankton to invertebrates to large pelagic fishes have been shown to ingest microplastics (or prey that contain them).[75] Thus, people who ingest aquatic plants or seafood may be exposed to concerning levels of contaminants. Ingestion of microplastics via food consumption raises health concerns because of the potential translocation of particles from the digestive tract to other tissues and as a delivery mechanism for toxic chemicals. Scientists have yet to fully investigate the human health implications of microplastic ingestion from fishes and other seafood, but it stands to be serious, especially given the prevalence of microplastics in fish caught and sold for human consumption both nationally and internationally.[76]

Robust medical evidence links various persistent organic pollutants commonly found on microplastics with a host of human illnesses, including cancers (e.g., breast cancer, pancreatic cancer, non-Hodgkin's lymphoma, adult-onset leukemia, and soft tissue sarcomas), neurological disorders (e.g., attention deficit disorder, impaired memory, learning disabilities, and behavioral

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[73] *See* UNEP, Guidelines on Best Available Techniques and Provisional Guidance on Best Environmental Practices relevant to Article 5 and Annex C of the Stockholm Convention on Persistent Organic Pollutants (2007), http:// chm.pops.int/Portals/0/download.aspx?d=UNEPPOPS-BATBEP-GUID-GUIDELINES-All.En.pdf [hereinafter UNEP Guidelines on Art. 5 & Annex C of POPS Convention].

[74] *See* Yibo Zhang et al., Leaching Characteristics of Trace Elements from Municipal Solid Waste Incineration Fly Ash, Geotechnical Special Publ'n 168, 168-78 (2016); IPEN, After Incineration: The Toxic Ash Problem (2005), http://ipen.org / sites/default/files/documents/After_ incineration_the_toxic_ash_problem_2015.pdf

[75] Romeo, Teresa et al., First evidence of presence of plastic debris in stomach of large pelagic fish in the Mediterranean Sea, 95 Marine Pollution Bull. 358 (2015).

[76] Van Cauwenberghe, Lisbeth & Colin R. Janssen, Microplastics in bivalves cultured for human consumption, 193 Envtl. Pollution 65 (2014); Bergmann, Melanie, Lars Gutow & Michael Klages (eds.), MARINE ANTHROPOGENIC LITTER (2015); Rochman, Chelsea M. et al., Anthropogenic debris in seafood: plastic debris and fibers from textiles in fish and bivalves sold for human consumption, 5 Sci. Reports 14,340 (2015); Herrera, A. et al., Microplastic ingestion by Atlantic chub mackerel (Scomber colias) in the Canary Islands coast, 139 Marine Pollution Bull. 127 (2019).

problems), and reproductive disorders (e.g., menstrual disorders, abnormal sperm, miscarriages, pre-term delivery, low birth weight, altered sex ratios, and shortened lactation periods).[77] Many of these persistent organic pollutants bioaccumulate and biomagnify up the food chain, posing a risk of harm for higher trophic-level organisms, including humans.[78]

b. Environmental and Climate Change Impacts from Plastic

i. Extraction and Production

As detailed above, 99% of plastic comes from fossil fuels. The extraction of oil and gas releases a huge amount of toxic substances into the air and water. Sources include direct emissions, like methane leakage and flaring, emissions from fuel combustion and energy consumption in the process of drilling for oil or gas, and emissions caused by land disturbance when forests and fields are cleared for well pads and pipelines.[79] Not only do these emissions harm the communities that live near the wells and plastic facilities, but greenhouse gas emissions threaten the ability of the global community to keep global temperature rise below 1.5 degrees Celsius.[80]

Plastic production is among the largest contributors to global greenhouse gas emissions from the industrial sector. The greenhouse gas impacts of plastic production and use are poised to grow dramatically in the coming years, driven by the ongoing rapid expansion of plastic production infrastructure—and the ongoing expansion in natural gas production that is fueling that plastic boom. If growth in plastic production and incineration continue as predicted, cumulative greenhouse gas emissions by 2050 will be over 56 gigatons CO2e, or between 10-13 percent of the total remaining carbon budget.[81]

Plastic refining is among the most greenhouse gas-intensive industries in the manufacturing sector—and the fastest growing. The manufacture of plastic is both energy and emissions intensive in its own right, producing significant emissions through the cracking of alkanes into olefins, the polymerization and plasticization of olefins into plastic resins, and other chemical refining processes. In 2015, 24 ethylene facilities in the US produced 17.5 million metric tons of CO2e, emitting as much CO2 as 3.8 million passenger vehicles.[82]

ii. Disposal

[77] Center for International Environmental Law, Plastic & Health: The Hidden Costs of a Plastic Planet (Feb. 2019a), https://www.ciel.org/plasticandhealth/.
[78] Rochman, Chelsea M. et al., Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress, 3 Scientific Reports 3263 (2013).
[79] Center for International Environmental Law, Plastic & Climate: The Hidden Costs of a Plastic Planet (May 2019b), https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-ClimateFINAL-2019.pdf.
[80] *Id.*
[81] *Id.*
[82] *Id.*

Most plastic items never fully disappear; they just get smaller and smaller. Many of these tiny plastic particles are swallowed by animals or fish who mistake them for food, and thus can find their way onto our dinner plates. They've also been found in a majority of the world's tap water. If current trends continue, our oceans could contain more plastic than fish by 2050.[83]

A rapidly growing body of research suggests there is not one square mile of ocean surface anywhere on earth not polluted with microplastics.[84] Microplastics are a major source of plastic pollution in the global ocean.[85] Ocean currents rapidly disperse microplastic particles, and scientists have found microplastics accumulating in remote locations far from population centers, including Arctic and Antarctic waters.[86] Given the alarming amount of plastic polluting coastal and marine ecosystems worldwide, we must seek ways to reduce the flow all plastic into our oceans. Existing regulatory schemes have proven insufficient to prevent this pollution, and new tactics are needed in order to mitigate the ongoing plastic pollution catastrophe.

Plastics harm fish and wildlife both through physical effects of ingestion (e.g. intestinal blockage) and by acting as a transfer agent for toxic chemicals.[87] Plastic is hydrophobic, meaning it tends to absorb hydrophobic persistent organic pollutants (POPs), such as polychlorinated biphenyls (PCBs), PAHs, heavy metals and dioxins while circulating in marine waters.[88] The accumulated pollutants can concentrate to as much as 100 times background levels in seawater.[89] Some of these chemicals have been found to desorb into tissues of marine species when ingested.[90] Scientists began acknowledging plastic's role as a toxin vector as early as 1973.[91] Because of their large surface-area-to-volume ratio and their tendency to attract contaminants

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[83] World Economic Forum 2016, The New Plastics Economy: Rethinking the Future of Plastics, http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf

[84] Eriksen, Marcus et al., Plastic pollution in the world's oceans: more than 5 trillion plastic pieces weighing over 250,000 tons afloat at sea, 9 PLoS ONE e111913 (2014).

[85] Boucher, Julien & Damien Friot, Primary microplastics in the oceans: a global evaluation of sources, IUCN (2017), https://portals.iucn.org/library/sites/library/files/documents/2017-002.pdf

[86] Chen, Q. et al., Marine microplastics bound dioxin-like chemicals: model explanation and risk assessment, 364 J. Hazardous Materials 82 (2019); Cózar, Andrés et al., The Arctic Ocean as a dead end for floating plastic in the North Atlantic branch of the Thermohaline Circulation, 3 Sci. Advances e1600582 (2017).

[87] Hammer, Jort, Michiel H.S. Kraak & John R. Parsons, Plastics in the Marine Environment: The Dark Side of a Modern Gift, 220 Rev. Envtl. Contamination & Toxicology (2012); Center for International Environmental Law, Plastic & Climate: The Hidden Costs of a Plastic Planet (May 2019b), https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-ClimateFINAL-2019.pdf.

[88] Teuten, Emma L. et al., Transport and release of chemicals from plastics to the environment and to wildlife, 364 Phil. Trans. R. Soc'y B 2027 (2009); Rochman, Chelsea M. et al., Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress, 3 Scientific Reports 3263 (2013).

[89] Yuko Ogata et al., International Pellet Watch: Global Monitoring of Persistent Organic Pollutants (POPs) in Coastal Waters, 58(10) Marine Pollution Bulletin 1437, 1437-46 (2009), https://doi.org/10.1016/j.marpolbul.2009.06.014.

[90] See Mark Anthony Browne et al., Microplastic Moves Pollutants and Additives to Worms, Reducing Functions Linked to Health and Biodiversity, 23(23) Current Biology 2388, 2388-92 (2013), https://doi.org/10.1016/j. cub.2013.10.012; see also Chelsea M. Rochman et al., Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress, 3 Sci. Rep. 3263 (2013), https://doi.org/10.1038/ srep03263.

[91] Center for International Environmental Law, Plastic & Climate: The Hidden Costs of a Plastic Planet (May 2019b), https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-ClimateFINAL-2019.pdf.

more readily than natural sediments, plastic fragments concentrate organic pollutants; these concentrations can be up to 1,000,000 times higher than that of the surrounding seawater.[92]

Aquatic species may ingest these pollutant-laden plastic particles, resulting in lethal and sublethal harms. The absorbed toxins—as well as plastic additives such as bisphenol A ("BPA"), phthalate plasticizers, and flame retardants—can leach from ingested plastics into animal tissues, inducing adverse effects such as endocrine disruption (that is, the disruption of hormone systems), neurotoxicity, and carcinogenesis.[93]

As in humans, persistent organic pollutants induce a wide variety of detrimental effects in aquatic organisms, including reproductive harm, compromised immune system function, cancer, and death.[94] These harms impact species across taxa, from bacteria to invertebrates, fish to reptiles, birds to mammals. Aquatic organisms exposed to PAHs may exhibit reduced growth; deformities; endocrine disruption; inhibited reproduction and reduced survival of young; toxicity to embryos; suppressed immune systems; liver and kidney toxicity; cancers; and mortality.[95] The most striking evidence for the effect of PAHs on marine mammals comes from an eight-year study on St. Lawrence Estuary beluga whales (Delphinapterus leucas). A quarter of adult St. Lawrence Estuary belugas—which are exposed to PAHs through the ingestion of contaminated worms—die from cancer.[96]

Scientists have documented over 900 species impacted by ocean plastic pollution and at least 701 that have ingested microplastics.[97] Because of their small size and environmental persistence,

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[92] Rios, Lorena M., Charles Moore & Patrick R. Jones, Persistent organic pollutants carried by synthetic polymers in the ocean environment, 54 Marine Pollution Bull. 1230 (2007); Guzzetti, Eleonora et al., Microplastic in Marine Organisms: Environmental and Toxicological Effects, 64 Envtl. Toxicology & Pharmacology 164 (2018).

[93] Teuten, Emma L. et al., Transport and release of chemicals from plastics to the environment and to wildlife, 364 Phil. Trans. R. Soc'y B 2027 (2009); Rochman, Chelsea M. et al., Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress, 3 Scientific Reports 3263 (2013); O'Donovan, Sarit et al., Ecotoxicological Effects of Chemical Contaminants Adsorbed to Microplastics in the Clam Scrobicularia plana, 5 Frontiers in Marine Sci. (2018), doi: 10.3389/fmars.2018.00143.

[94] Albers, P., Petroleum and Individual Polycyclic Aromatic Hydrocarbons, Ch. 14 in HANDBOOK OF ECOTOXICOLOGY (David J. Hoffman et al. eds. 2nd ed. 2003).

[95] *Id.*; Bell, Barbara et al., High incidence of deformity in aquatic turtles in the John Heinz National Wildlife Refuge, 142 Envtl. Pollution 457 (2006); Cousin, Xavier and Jérôme Cachot, PAHs and fish—exposure monitoring and adverse effects— from molecular to individual level, 21 Envtl. Sci. & Pollution Research 13,685 (2014); Malcolm, H. M. & Richard F. Shore, Effects of PAHs on Terrestrial and Freshwater Birds, Mammals and Amphibians, in Ch. 12 PAHS: AN ECOTOXICOLOGICAL PERSPECTIVE (Peter E.T. Douben ed. 2003); Payne, J. F. et al., Ecotoxicological Studies Focusing on Marine and Freshwater Fish, in Ch. 11 PAHS: AN ECOTOXICOLOGICAL PERSPECTIVE (Peter E.T. Douben ed. 2003).

[96] Albers, P.H. & T. R. Loughlin, Effects of PAHs on Marine Birds, Mammals and Reptiles, Ch. 13 in PAHS: AN ECOTOXICOLOGICAL PERSPECTIVE (Peter E.T. Douben ed. 2003); Martineau, Daniel, Contaminants and Health of Beluga Whales of the Saint Lawrence Estuary, in Ch. 17 ECOSYSTEM HEALTH AND SUSTAINABLE AGRICULTURE 2 (Norrgren, L. & J. Levengood eds. 2012).

[97] Gall, S.C. & R.C. Thompson, The Impact of Debris on Marine Life, 92 Marine Pollution Bull. 170 (2015); Litterbase: Online Portal for Marine Litter (2019), https://litterbase.awi.de/; Susanne Kühn, Jan Andries van Franeker, Quantitative overview of marine debris ingested by marine megafauna, Marine Pollution Bulletin, Volume 151, 2020, doi.org/10.1016/j.marpolbul.2019.110858.

microplastics remain readily available to ingestion by a wide variety of marine organisms for an extended period of time.[98] Plankton, invertebrates, fish, sea birds, sea turtles, and marine mammals all are known to adsorb, ingest, or otherwise uptake microplastics.[99] Trophic transfer of microplastics (i.e., transfer up the food chain) also occurs, with the potential transfer of microplastics to humans when they eat shrimp, bivalves, fish, or other marine organisms containing these pollutants.[100]

Smaller and larger microplastic particles harm wildlife in different ways. Larger particles may have longer residence time in the digestive tract, in turn leading to increased toxicant release.[101] Smaller micro- and nanoplastics may move into an organism's cells, causing a variety of harms discussed in more detail below.[102] Smaller particles may also carry more of a toxicant load, as their increased surface area to volume ratio allows them to adsorb more contaminants.[103] Documented harms from ingestion of microplastics and adsorbed contaminants include but are not limited to decreased feeding and growth; increased stress; behavioral modifications; reproductive harms; immunotoxicity; neurological harms; alteration of gene expression; cancer; and increased mortality.[104]

In addition to wildlife impacts, microplastic pollution impacts ecosystem structure and function.[105] For example, microplastics affect seafloor and open ocean habitats by altering biogeochemical cycles, including carbon storage (with implications for climate change).[106] Microplastics affect nearshore and inshore environments—such as sandy beaches— through

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[98] Nelms, S.E. et al., Microplastics in marine mammals stranded around the British coast: ubiquitous but transitory?, 9 Scientific Reports 1075 (2019).

[99] Anbumani, Sadasivam & Poonam Kakkar, Ecotoxicological Effects of Microplastics on Biota: A Review, 25 Envtl. Sci. & Pollution Res. 14,373 (2018); O'Donovan, Sarit et al., Ecotoxicological Effects of Chemical Contaminants Adsorbed to Microplastics in the Clam Scrobicularia plana, 5 Frontiers in Marine Sci. (2018), doi: 10.3389/fmars.2018.00143; Duncan, Emily M. et al., Microplastic ingestion ubiquitous in marine turtles, 25 Global Change Biology 744 (2019).

[100] O'Donovan, Sarit et al. (2018); Donohue, Mary J. et al., Evaluating exposure of northern fur seals, Callorhinus ursinus, to microplastic pollution through fecal analysis, 138 Marine Pollution Bull. 213 (2019); Herrera, A. et al., Microplastic ingestion by Atlantic chub mackerel (Scomber colias) in the Canary Islands coast, 139 Marine Pollution Bull. 127 (2019); Ferreira, Guilherme V.B., Mário Barletta & André R.A. Lima et al., Use of estuarine resources by top predator fishes. How do ecological patterns affect rates of contamination by microplastics?, 655 Sci. Total Envt. 292 (2019); Center for International Environmental Law, Plastic & Health: The Hidden Costs of a Plastic Planet (Feb. 2019a), https://www.ciel.org/plasticandhealth/.

[101] O'Donovan, Sarit et al., Ecotoxicological Effects of Chemical Contaminants Adsorbed to Microplastics in the Clam Scrobicularia plana, 5 Frontiers in Marine Sci. (2018), doi: 10.3389/fmars.2018.00143

[102] *Id.*

[103] Anbumani, Sadasivam & Poonam Kakkar, Ecotoxicological Effects of Microplastics on Biota: A Review, 25 Envtl. Sci. & Pollution Res. 14,373 (2018); O'Donovan, Sarit et al., Ecotoxicological Effects of Chemical Contaminants Adsorbed to Microplastics in the Clam Scrobicularia plana, 5 Frontiers in Marine Sci. (2018), doi: 10.3389/fmars.2018.00143

[104] O'Donovan et al 2018.

[105] Guzzetti, Eleonora et al., Microplastic in Marine Organisms: Environmental and Toxicological Effects, 64 Envtl. Toxicology & Pharmacology 164 (2018); Center for International Environmental Law, Plastic & Climate: The Hidden Costs of a Plastic Planet (May 2019b), https://www.ciel.org/wp-content/uploads/2019/05/Plastic-and-ClimateFINAL-2019.pdf.

[106] *Id.*

sediment contamination.[107] The presence of microplastics also alters physical properties of beaches, including heat transfer and water movement.[108] These changes may have broad ecological implications for a wide variety of beach dwelling organisms and their eggs—including crustaceans, molluscs, fish, and sea turtles—and climate change may exacerbate these impacts.[109] These concerns are not merely theoretical: researchers recently found anthropogenic marine debris, including plastics, at 10 loggerhead sea turtle nesting beaches—including protected areas.[110]

In addition, because plastics do not readily degrade, they become vehicles for invasive species dispersal—effectively serving as a raft for exotic species transport and as a colonizing surface in areas otherwise lacking one.[111] These invasive organisms can prove devastating when they move into a new area, wiping out native species, and also harming human health and local economies.[112] Finally, plastic pollution litters our beaches, harming the aesthetic, recreational, tourism, and economic values of our waterways and seashores.

2. *The Plastics Industry Is on the Verge of a Huge Expansion*

To address the human health and environmental crises that plastic consumption is causing, we must reduce our production and consumption of plastic products. The federal government has the power as the largest consumer in the country to slow down plastic production and its associated environmental and human health harms, but it must act fast to counteract the plastic industry's expansion plans.

The fossil fuel and petrochemical industries are planning a massive expansion of petroplastics facilities that would rapidly increase plastic production, including single use plastic products and their associated pollution. In its 2018 Annual Energy Outlook, the U.S. Energy Information Administration projected that natural gas plant liquids production (including predominantly

[107] Rios, Lorena M., Charles Moore & Patrick R. Jones, Persistent organic pollutants carried by synthetic polymers in the ocean environment, 54 Marine Pollution Bull. 1230 (2007); Gall, S.C. & R.C. Thompson, The Impact of Debris on Marine Life, 92 Marine Pollution Bull. 170 (2015)
[108] Carson, Henry S. et al., Small plastic debris changes water movement and heat transfer through beach sediments, 62 Marine Pollution Bull. 1708 (2011); Gall, S.C. & R.C. Thompson, The Impact of Debris on Marine Life, 92 Marine Pollution Bull. 170 (2015).
[109] Carson, Henry S. et al., Small plastic debris changes water movement and heat transfer through beach sediments, 62 Marine Pollution Bull. 1708 (2011); Valenzuela, N. et al., Extreme Thermal Fluctuations from Climate Change Unexpectedly Accelerate Demographic Collapse of Vertebrates with Temperature-Dependent Sex Determination, 9 Nature Sci. Rep. 4254 (2019), https://www.nature.com/articles/s41598-019- 40597-4.pdf.
[110] Garrison, Samantha R. & Mariana M.P.B. Fuentes, Marine Debris at Nesting Grounds Used by the Northern Gulf of Mexico Loggerhead Recovery Unit, 139 Marine Pollution Bull. 59 (2019).
[111] Mearns, Alan J. et al., Effects of Pollution on Marine Organisms, 85 Water Envt. Research 1828 (2013); Wright, Stephanie L. et al., Microplastic ingestion decreases energy reserves in marine worms, 23 Current Biology R1031 (2013); Gall, S.C. & R.C. Thompson, The Impact of Debris on Marine Life, 92 Marine Pollution Bull. 170 (2015); Guzzetti, Eleonora et al., Microplastic in Marine Organisms: Environmental and Toxicological Effects, 64 Envtl. Toxicology & Pharmacology 164 (2018).
[112] Barnes, David K.A. et al., Accumulation and fragmentation of plastic debris in global environments, 364 Phil. Trans. R. Soc. B 1985 (2009).

ethane and propane) will double between 2017 and 2050, supported by an increase in global petrochemical industry demand and ethane availability in the United States.[113]

In line with these projections and the oversupply of ethane, the petrochemical industry has been announcing a wave of investments in capacity expansion and new facilities to process ethane since early 2011, with its current tally at $204B and 337 projects.[114]

In 2015, there were 28 ethylene crackers in the United States producing 28.4 million metric tons of ethylene per year.[115] Two years later, there were at least six more new or expanded U.S. crackers: an OxyChem/Mexichem facility in Ingleside, Texas; a Shintech facility in Plaquemine, Louisiana; two LyondellBasell plants in Corpus Christi and Channelview, Texas; and an Indorama (restart) in Lake Charles, Louisiana.[116] A second wave of U.S. petrochemical projects has emerged since that time, which includes expansions into the Appalachian region of the United States (starting with Pennsylvania and Ohio, with indications that West Virginia will soon follow).[117] Nine new ethane crackers alone are in the development pipeline, with plans to open by 2020 and churn out 10.7 million more tons of ethylene each year.

According to the U.S. Department of Energy, more than 95 percent of U.S. ethylene production capacity is located in either Texas or Louisiana.[118] While production in the Appalachian region has been slower, it is projected to rapidly grow in the coming years, with other regions to follow.[119] Overall, the U.S. Energy Information Administration projects annual U.S. ethane consumption to grow from an estimated 1.2 million barrels per day in 2017 to 1.6 million in 2019 as new plants and infrastructure ramp up operations.[120]

Additional analyses of the plastic and petrochemical industries are largely consistent in forecasting significant growth in both production and consumption of plastic over the next

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[113] U.S. Energy Information Administration (EIA), Annual Energy Outlook (2018), https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf

[114] American Chemistry Council, U.S. Chemical Industry Investment Linked to Shale Gas Reaches $200 Billion (Sept. 2018), https://www.americanchemistry.com/Media/PressReleasesTranscripts/ACC-news-releases/USChemical-Industry-Investment-Linked-to-Shale-Gas-Reaches-200-Billion.html.

[115] Koottungal, L., International Survey of Ethylene from Steam Crackers, Oil & Gas Journal (July 6, 2015), https://www.ogj.com/refiningprocessing/petrochemicals/article/17237013/international-survey-of-ethylene-from-steamcrackers-2015.

[116] Petrochemical Update, Insights from first wave of US ethylene projects drive second wave decisions (May 5, 2017), http://analysis.petchem-update.com/engineering-andconstruction/insights-first-wave-us-ethylene-projects-drive-second-wave-decisions.

[117] Independent Chemical Information Service (ICIS), Visibility clears on the 2nd wave of U.S. petrochemical projects (April 13, 2017), https://www.icis.com/explore/resources/news/2017/04/12/10097296/visibility-clears-on-the-2ndwave-of-us-petrochemical-projects/.

[118] U.S. Department of Energy (DOE), Ethane Storage and Distribution Hub in the United States, Report to Congress (Nov. 2018), https://www.energy.gov/sites/prod/files/2018/12/f58/Nov%202018%20DOE%20Ethane%20Hub %20Report.pdf.

[119] *Id.*

[120] U.S. Energy Information Administration (EIA), U.S. ethane consumption, exports to increase as new petrochemical plants come online (2018), https://www.eia.gov/todayinenergy/detail.php?id=35012

several decades. The World Economic Forum (WEF) predicts growth in plastic production of 3.5–3.8 percent per year through 2050.[121] Material Economics projects plastic production to more than double, from just over 320 million Mt per year in 2015 to over 800 million Mt per year by 2050.[122] The International Energy Agency (IEA) predicts slightly slower growth, but still projects a nearly 70 percent increase in key thermoplastic production between 2017 and 2050.[123]

These projections not only forecast an impending acceleration of plastic production and waste, but also underscore the importance of growing plastic production as a driver of increased fossil fuel demand. According to WEF, plastic production accounts for 4–8 percent of global oil consumption annually, with roughly half used for material feedstock and half used for energy in the production process.[124] WEF estimates that, if growth trends continue, plastic will account for 20 percent of global oil consumption by 2050. IEA's The Future of Petrochemicals report predicts that petrochemicals will account for more than a third of oil production growth through 2030 and more than half of oil production growth through 2050.[125]

Without action from the federal government, the plastics industry's plans to expand will be harder and harder to staunch. From the Center for International and Environmental Law: "Plastics manufacturers assume demand for disposable plastics will continue to rise, despite evidence that global awareness of plastic pollution is growing and cultural attitudes are changing. Industry investments reflect a further underlying assumption that supplies of cheap hydrocarbons will remain the norm for decades to come, even as the global community has begun to phase out the very fossil fuels upon which plastics producers depend."[126]

Plastics producers are depending on increasing demand and abundant feedstock supply to fuel their industry for the next several decades.[127] By disrupting this demand, the federal government could influence the fate of the plastics industry and push the nation, and the world, on a more sustainable path forward.

In its seminal report on the United States' role in global ocean plastic waste, the National Academy of Science (NAS) recognized that the United States lacks a nationwide system strategy for reducing plastic waste at all stages of the plastic life cycle. The NAS report recommends the United States to design and implement a framework for a system of interventions on plastic waste "to position the nation to sharpen and influence global scale requirements around

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[121] World Economic Forum, The New Plastics Economy 19, n. 18 (2016), http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy. pdf.
[122] See Material Economics, The Circular Economy— A Powerful Force for Climate Mitigation 12, Ex. 1.2 (2018), https://materialeconomics.com/ publications/the-circular-economy-a-powerfulforce-for-climate-mitigation
[123] www.iea.org/petrochemicals
[124] World Economic Forum, The New Plastics Economy 19, n. 18 (2016), http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy. pdf
[125] IEA 2018, The Future of Petrochemicals, iea.org/reports/the-future-of-petrochemicals
[126] http://www.ciel.org/wp-content/uploads/2018/04/Fueling-Plastics-Untested-Assumptions-and-Unanswered-Questions-in-the-Plastics-Boom.pdf
[127] *Id.*

production, formulation, design, innovation, and waste reduction. This, in turn, can create innovation and economic opportunities that also internalize economic externalities and increase societal and environmental well-being."[128] As part of this framework, the NAS recommends mandatory procurement rules favoring reusable products to decrease waste generation in this country.[129]

As the NAS report recognizes, one of the most direct and effective ways to address the plastic crisis is to dramatically reduce the production of unnecessary plastic. The GSA can use the power of the pocketbook to limit the demand, and therefore the production and use of single-use, disposable plastic products. When the federal government spends money strategically, it can act as a powerful market leader, driving change across entire industries. The federal government has the power as the largest consumer in the country to slow down plastic production and its associated environmental and human health harms.

3. *Alternatives to Single-Use Plastics Exist*

The federal government does not need to purchase single-use plastics. While over 40% of all plastic produced is made for single-use plastic products, designed to be thrown away immediately after use, nonhazardous, environmentally-preferable alternatives to single-use plastics exist and are readily available.

The UN Environment Program (UNEP) recently published a report on single-use plastic products and recommendations for alternatives, based on life cycle assessment studies.[130] These single-use plastic products include food packaging, bottles, straws, containers, cups, cutlery, and shopping bags. The report specifically identifies government procurement as a policy instrument to reduce single-use plastic products at a national level.

The life cycle analyses conducted by the UNEP rely on the consideration of many factors specific to the product at hand. For example, when considering the impacts of single-use plastic bags, decision makers must consider the material and weight of a shopping bag, the number of times it is used, the technology and energy use of the production processes, and the waste management process.

For each category of product, the UNEP reports lay out a wide variety of alternatives to single-use plastics. For example, when evaluating beverage bottles, the studies compared single use plastic bottles with beverage containers made of other materials (aluminum cans, glass bottles, cartons, reusable steel bottles) and analyzed the performance based on a number of metrics

[128] The National Academies of Sciences, Engineering, and Medicine. 2021. *Reckoning with the U.S. Role in Global Ocean Plastic Waste*. Washington, DC: The National Academies Press. https://doi.org/10.17226/26132.
[129] *Id.* at 120.
[130] U.N. Environmental Program 2021, Addressing Single-Use Plastic Productions Pollution Using a Life Cycle Approach, https://sdg.iisd.org/news/unep-report-spotlights-best-alternatives-to-single-use-plastic-products/

(volume and weight of the container, functional differences, reuse rate and end of life practices) to understand the environmental impact of each material. The environmental performance of each of these alternatives can be used to guide procurement decisions regarding which products should be used to replace single-use plastics. The report emphasizes that products intended for single use are problematic, regardless of their material. Therefore, the report recommends policymakers to promote reusable products.

Of course, there will always be environmental impacts from products that we produce and use, and trade-offs will need to be made. But life-cycle thinking and analysis helps identify those tradeoffs in a transparent way, and gives decision-makers better information in deciding which products meet statutory and regulatory standards and best serve the public interest.

Furthermore, a restriction on the acquisition and procurement of single-use plastic products by the federal government will spur a new marketplace for plastic alternatives and jump-start innovative developments. President Biden specifically noted the power of the federal government to promote the transition to a circular economy in his recent Executive Order on clean energy and federal sustainability.[131] Historically, regulatory mandates in other industries have encouraged innovation, and there is no reason to believe that the same would not happen here.

For example, the Clean Air Act mandates "best available control technology" and sets emission standards to force the adoption of new technology.[132] This approach has proved successful in, among other things, reducing diesel emissions and reducing criteria pollutant emissions from power plants. The Biden Administration can further this legacy of environmental regulation and technological innovation in the field of single use plastic alternatives.

4. *Current Procurement Guides are Ineffective at Eliminating Single Use Plastic*

While there are a variety of important programs that aim to reduce the impact of the government's purchases on the environment, the failure of any of them to specifically regulate plastics is a glaring omission.

To comply with the FAR's requirements to "maximize the utilization of environmentally preferable products," the GSA is required to follow the guidelines put forth by EPA's Environmentally Preferable Purchasing (EPP) Program. FAR 23.703. The EPP Program helps federal agencies purchase greener products and services. EPA also publishes "Recommendations of Specifications, Standards, and Ecolabels" to help federal purchasers identify and procure environmentally preferable products and services. "The Recommendations leverage private sector approaches to defining and measuring sustainability by including over 40 private sector standards/ecolabels in 25 purchase categories. The Recommendations give preference to multi-

[131] Exec. Order 14057, Sec. 207 (Dec. 8, 2021).
[132] 42 U.S.C. § 165(a).

attribute/life-cycle based standards/ecolabels that address key impact areas (aka hotspots) and where product conformance is determined by a competent third-party certification body."

Beyond the EPA's EPP Program and its Recommendations regarding private sector standards, there are a dizzying array of "green" procurement programs, including but not limited to Bio-Preferred; Comprehensive Procurement Guidelines; Safer Choice; Energy Star; EPEAT; Federal Energy Management Program (FEMP); Significant New Alternatives Policy (SNAP); and WaterSense. GSA's "Green Procurement Compilation" attempts to consolidate and organize information from federal environmental programs in one place, addressing green product requirements and optional green practices by purchase category.

In addition to federal regulations, EPA guidelines, and voluntary "green" procurement programs, the most recent Executive Orders on sustainable acquisition and procurement, "Planning for Federal Sustainability in the Next Decade" and "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability" mandate agencies to promote sustainable acquisition and procurement, incentivize markets for sustainable products, and prioritize products that can be reused.[133]

Yet despite the myriad of programs aimed at promoting sustainable purchasing by the federal government, there are no requirements for agencies to reduce their levels of plastic acquisition. Federal regulations require all procurements to be "environmentally preferable," yet the GSA continues to purchase single-use plastic items in vast quantities. As detailed above, single use disposable plastic is not "environmentally preferable" at any stage of its life-cycle. GSA must revise its regulations to restrict the procurement and use of single-use plastic items. These revisions are necessary to ensure federal agencies are making environmentally preferable purchases, limiting the generation of hazardous plastic waste and pollution, and promoting the use of nonhazardous materials as required by the FAR. 23.703.

To make "significant revisions" to the GSAR, the GSA must publish the revisions in the Federal Register and solicit agency and public views through a rulemaking process before any changes are finalized. 501.304, 501. Through this petition, the Petitioners request that the GSA revise the GSAR to restrict the procurement and use of single use plastic, with exemptions for disability accommodations, medical use, and disaster response. Specifically, we ask for the GSA to publish regulations to prohibit the sale or distribution of single-use plastic bags and other single-use products, including plastic utensils, straws, other non-recyclable food service products, and single-use personal care product containers. Instead, these items should be replaced by reusable or refillable items.

[133] Exec. Order 13693, Planning for Federal Sustainability in the Next Decade, 80 Fed. Reg. 15869 (Mar. 19, 2015); Exec. Order 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, 86 Fed. Reg. 70935 (Dec. 8, 2021)..

These changes are necessary because single-use plastic is harmful to human health and the environment, and because nonhazardous and environmentally-preferable alternatives are readily available. Just as President Clinton's ban on smoking in federal buildings in 1997 prompted widespread smoking bans and reduced public health risks,[134] President Biden can prompt a transition to a plastic-free future by eliminating the use of single-use plastic by the federal government.

VI. Conclusion

This Administration must tackle the plastic pollution crisis by harnessing the power of the federal pocketbook and leading by example. Revising federal regulations to reduce and eliminate procurement of single-use plastic products will reduce unnecessary waste and pollution that is impacting the entire planet and disproportionately harming poor communities and communities of color. A federal procurement mandate will also spur innovation in the field of reusable products and packaging. These changes are necessary to meet overarching statutory and regulatory standards and further the Biden Administration's public policy of improving human health, protecting the environment, tackling climate change, and advancing equity in underserved communities.

[134] Exec. Order 13058, Protecting Federal Employees and the Public From Exposure to Tobacco Smoke in the Federal Workplace, 62 Fed. Reg. 43451 (August 9, 1997); Cook, D. M., & Bero, L. A. (2009). The politics of smoking in federal buildings: an executive order case study. *American journal of public health*, *99*(9), 1588–1595. https://doi.org/10.2105/AJPH.2008.151829