Sweeping New Report on Global Environmental Impact of Plastics Reveals Severe Damage to Climate

Study Recommends Solutions, Including Phasing Out Single-Use Plastics

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WASHINGTON, DC — In 2019 alone, the production and incineration of plastic will add more than 850 million metric tons of greenhouse gases to the atmosphere—equal to the pollution from 189 new coal-fired power plants, according to a new report, *Plastic & Climate: The Hidden Costs of a Plastic Planet*. The rapid global growth of the plastic industry—fueled by cheap natural gas from hydraulic fracturing—is not only destroying the environment and endangering human health but also undermining efforts to reduce carbon pollution and prevent climate catastrophe.

This is the conclusion of a sweeping new study of the global environmental impact of the plastic industry by the Center for International Environmental Law, Environmental Integrity Project, FracTracker Alliance, Global Alliance for Incinerator Alternatives, 5 Gyres, and Break Free From Plastic.

The new report gathers research on the greenhouse gas emissions of plastic at each stage of the plastic lifecycle—from its birth as fossil fuels through refining and manufacture to the massive emissions at (and after) plastic's useful life ends—to create the most comprehensive review to date of the climate impacts of plastic.

With the ongoing, rapid expansion of the plastic and petrochemical industries, the climate impacts of plastic are poised to accelerate dramatically in the coming decade, threatening the ability of the global community to keep global temperature rise below 1.5°C degrees. If plastic production and use grow as currently planned, by 2030, emissions could reach 1.34 gigatons per year—equivalent to the emissions released by more than 295 500-megawatt coal power plants. By 2050, the production and disposal of plastic could generate 56 gigatons of emissions, as much as 14 percent of the earth’s entire remaining carbon budget.

The rapid growth of the industry over the last decade, driven by cheap natural gas from the hydraulic fracturing boom, has been most dramatic in the United States, which is witnessing a dramatic buildout of new plastic infrastructure in the Gulf Coast and in the Ohio River Valley.

For example, in western Pennsylvania, a new Shell natural gas products processing plant being constructed to provide ingredients for the plastics industry (called an “ethane cracker”) could emit up to 2.25 million tons of greenhouse gas pollution each year (carbon dioxide equivalent tons). A new ethylene plant at ExxonMobil’s Baytown refinery along the Texas Gulf Coast will release up to 1.4 million tons, according to the *Plastic and Climate* report. Annual emissions from just these two new facilities would be equal to adding almost 800,000 new cars to the road.

Yet they are only two among more than 300 new petrochemical projects being built in the US alone, primarily for the production of plastic and plastic additives.

Plastic in the environment is one of the least studied sources of emissions—and a key missing piece from previous studies on plastic's climate impacts. Oceans absorb a significant amount of the greenhouse gases produced on the planet—as much as 40 percent of all human-produced carbon dioxide since the beginning of the industrial era. *Plastic & Climate* highlights how a small but growing body of research suggests plastic discarded in the environment may be disrupting the ocean's natural ability to absorb and sequester carbon dioxide.

Plastic & Climate uses conservative assumptions to create a projection of plastic's climate impacts under a business-as-usual scenario, meaning that the actual climate impacts of plastic are likely to exceed these projections.

The report identifies a series of actions that can be taken to reduce these climate impacts, concluding that the most effective way to address the plastic crisis is to dramatically reduce the production of unnecessary plastic, beginning with national and global bans on nearly all single-use, disposable plastic.

The proposed solutions include:

- ending the production and use of single-use, disposable plastic;
- stopping development of new oil, gas, and petrochemical infrastructure;
- fostering the transition to zero-waste communities;
- implementing extended producer responsibility as a critical component of circular economies; and
- adopting and enforcing ambitious targets to reduce greenhouse gas emissions from all sectors, including plastic production.

Quotes From the Authors

Carroll Muffett, President, CIEL:
"Humanity has less than twelve years to cut global greenhouse emissions in half and just three decades to eliminate them almost entirely. The massive and rapidly growing emissions from plastic production and disposal undermine that goal and jeopardize global efforts to keep climate change below 1.5 degrees of warming. It has long been clear that plastic threatens the global environment and puts human health at risk. This report demonstrates that plastic, like the rest of the fossil economy, is putting the climate at risk as well. Because the drivers of the climate crisis and the plastic crisis are closely linked, so to are their solutions: humanity must end its reliance on fossil fuels and on fossil plastics that the planet can no longer afford."

Courtney Bernhardt, Director of Research, Environmental Integrity Project:

"Our world is drowning in plastic, and the plastics industry has been overlooked as a major source of greenhouse gases. But there are ways to solve this problem. We need to end the production of single use, disposable plastic containers and encourage a transition to a zero-waste future."

Matt Kelso, Manager of Data and Technology, FracTracker Alliance:
"The overwhelming majority of plastics are produced from ethane, a component of natural gas and petroleum. The story of plastic's contribution to climate change really begins at the wellhead, and we can therefore say that a portion of carbon emissions from oil and gas production is attributable to the creation of plastics. As gas travels from hundreds of thousands of wells through a network of millions of miles of pipelines on its way to downstream facilities, there are countless releases of carbon through leaks, venting, and flaring, mostly in the form of carbon dioxide and methane. But in order to get a full picture of these impacts, we have also examined emissions from trucks and heavy machinery that service this gigantic industry, as well as the removal of vast stretches of forested land, which can no longer ameliorate the carbon pollution of the industry. At a time when atmospheric carbon dioxide is spiking dramatically, we need to take a hard look at the consequences of extracting carbon from the ground in the first place, including for the production of plastics."

Doun Moon, Research Associate, GAIA:
"There is no such thing as an "end-of-life" for plastic as it continues to pose a significant threat to the climate long after it reaches the final phase of its lifecycle. Waste incineration, also referred to as Waste-to-Energy, is the primary source of greenhouse gas emissions from plastic waste management, even after considering the electricity that can be generated during the process. The industry's plans to massively expand both petrochemical production and waste incineration are incompatible with the urgent need for climate mitigation. Our analysis evidently shows that waste prevention coupled with reduced plastic production is by far the most effective way to reduce GHG emissions, and practically the only path forward in order to turn the tide on ever-intensifying climate change."

Rachel Labbe-Bellas, Science Programs & Development Manager, 5 Gyres:
5 Gyres' collaboration on the CIEL Plastics & GHGs report helps explain the possible GHG impacts of ocean plastics, including potentially accelerated GHG emissions from microplastics, and the impact of plastics on CO2 uptake by ocean ecosystems. This was a novel subject for 5 Gyres despite our expertise of ocean plastics, and given that only one scientific publication to this date has looked at ocean plastic greenhouse gas emissions. During the 10 years of research in ocean plastic pollution, we have observed the evolution of our understanding of this issue. Now more than ever, we have seen a shift in attention towards understanding the sources of ocean plastics before entering the ocean. The underlying belief of 5 Gyres is that we must stop the flow of plastic pollution from source to sea - which suggests that its time we start ranking today's proposed solutions which can be found in this report. CIEL has courageously taken initiative to include us, bridging the conversation of the upstream plastic production

impacts until its "end-of life" - from those floating at sea, sitting on our shorelines, or resting on the seafloor.

Von Hernandez, Global Coordinator, Break Free From Plastic:
“Both the climate emergency and the plastic pollution crisis are driven by fossil fuel dependence. It is therefore not surprising that the continuing production, use, and disposal of plastics will further exacerbate the climate crisis. Simply put, more throwaway plastic translates to runaway climate change. The production of plastics must be significantly curtailed for humanity to have a real, fighting chance in averting catastrophic climate change while reversing the plastic pollution crisis at the same time.”

What Experts are Saying:

Jeffrey Morris, Ph.D. Economist, Sound Resource Management Group:
"There are at least three very problematic materials in our garbage – diapers, pet wastes and plastic packaging and films. Figuring out how to manage them keeps solid waste system managers up at night. In particular, plastic packaging and films cause severe problems at recycling sorting facilities, are the source of substantial fossil carbon emissions when burned at incineration waste-to-energy facilities, and are ubiquitous in environmental litters. Because plastics are relatively inefficient as a fuel source and also contain many additives that release pollutants harmful to human and ecosystems health, the solution to plastics littering our waters and landscapes does not lie with using waste plastics as energy sources. That will increase the harm waste plastics are already doing to our climate and health. Rather, effective solutions to our plastics crisis need to come from reductions in the generation of plastics waste by such actions as eliminating single use plastic packaging of all kinds, promoting compostable as well as reusable food carry out containers, and requiring true biodegradability in all items that currently are found on roadsides, in waterways and our oceans."

Graham Forbes, Global Plastics Project Leader, Greenpeace:
“This report is yet another example of why the corporate throwaway culture must end. Not only are plastics killing marine animals, endangering our health, and creating a global pollution crisis, they are contributing to catastrophic climate change. It is more clear than ever that companies and governments must take strong action to phase out single-use plastics immediately and move toward systems of reuse.”

Priscilla Villa, Earthworks’ South Texas Organizer, Earthworks:
"Plastics are fueling the climate catastrophe because they're made from oil and gas, and oil and gas pollution is the main reason climate change is rapidly accelerating. Planned plastics production facilities in the Gulf Coast and Appalachia would worsen our global climate crisis while also threatening vulnerable communities with more intense storms like Hurricane Harvey. We need to rapidly transition away from fossil fuels, including single-use plastics."

Jacqueline Savitz, Chief Policy Officer of North America, Oceana:
"This report shows that the avalanche of plastics flowing into our oceans — equivalent to a dump truck-load every minute — is just the tip of the iceberg. On top of the choking sea turtles, starving seabirds and dying whales, we can add plastic-driven melting ice caps, a rising sea level and devastating storms. Whether you are a coastal resident or a farmer, a marine mammal or a sea turtle, plastic is the enemy. We need to cap its production and then cut it down. Companies must give us better choices. Otherwise we are all going to drown in it — figuratively, if not literally."

Dianna Cohen, Co-Founder and CEO, Plastic Pollution Coalition:
"We commend CIEL and partners' new report *Plastic and Climate: The Hidden Costs of a Plastic Planet* for demonstrating the alarming climate impacts of plastic. Plastic pollution is an urgent global crisis, and plastic pollutes at every stage: from extraction to disposal and incinerator. This is a decisive moment when we will no longer accept business as usual. Join us in demanding a shift in the system for the health of the Earth and all its living creatures."

Authoring Organizations

Center for International Environmental Law (CIEL) uses the power of law to protect the environment, promote human rights, and ensure a just and sustainable society. CIEL seeks a world where the law reflects the interconnection between humans and the environment, respects the limits of the planet, protects the dignity and equality of each person, and encourages all of earth's inhabitants to live in balance with each other.

Environmental Integrity Project is a nonprofit, nonpartisan organization that empowers communities and protects public health and the environment by investigating polluters, holding them accountable under the law, and strengthening public policy. (Chapter 5: Refining & Manufacture)

FracTracker Alliance is a nonprofit organization that studies, maps, and communicates the risks of oil and gas development to protect our planet and support the renewable energy transformation. (Chapter 4: Extraction & Transport)

Global Alliance for Incinerator Alternatives (GAIA) is a worldwide alliance of more than 800 grassroots groups, non-governmental organizations, and individuals in over 90 countries whose ultimate vision is a just, toxic-free world without incineration. (Chapter 6: Waste Management)

Sound Resource Management Group, Inc. has been working to shrink pollution footprints, reduce waste and conserve resources throughout the US and Canada since 1987. We have experience working with hundreds of businesses, governments, and non-profit organizations. (Chapter 6: Waste Management)

5 Gyres is nonprofit organization focused on stopping the flow of plastic pollution through science, education, and adventure. We employ a science to solutions model to empower community action, engaging our global network in leveraging science to stop plastic pollution at the source. (Chapter 7: Plastic in the Environment)

#breakfreefromplastic is a global movement envisioning a future free from plastic pollution made up of nearly 1,500 organizations from across the world demanding massive reductions in single-use plastic and pushing for lasting solutions to the plastic pollution crisis.

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