



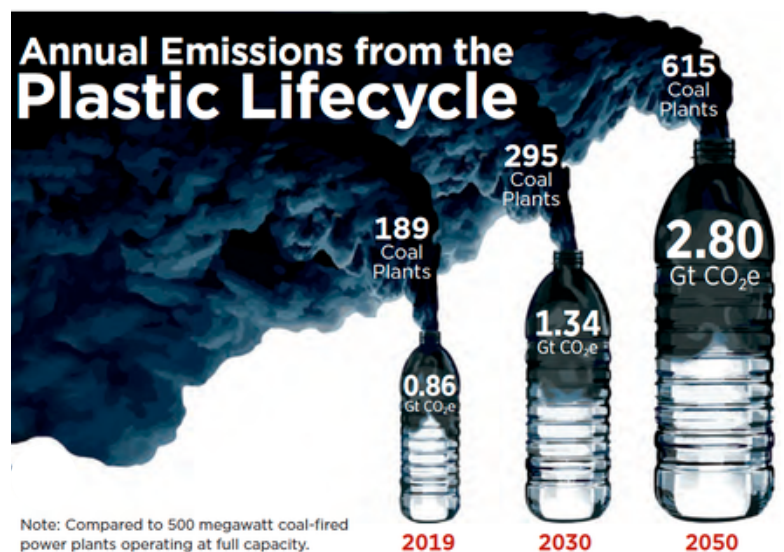
Plastic is Carbon

Unwrapping the "net zero" myth

SUMMARY

Under the cover of “net zero,” the plastics and petrochemical industry is trying to greenwash expanded plastic production and use. “Net zero” plans purport to make continued use of fossil fuels “emission-free,” but scientists, Indigenous peoples, and civil society organizations oppose this diversion that creates risks for communities and the environment. The risks of these false “net zero” narratives are rising rapidly as the oil and gas industry continues investing billions to make plastic production its financial lifeline.

Plastic is a major threat to our climate. Production and incineration of plastics are on track to emit 2.8 gigatons of CO₂e per year by 2050—as much as 615 coal plants—and burn through up to 13% of the ever-shrinking global 1.5C carbon budget. Plastic begins as a fossil fuel, and greenhouse gases are emitted at every stage of its lifecycle: oil and gas extraction and transport, plastic production and manufacture, plastic waste management or incineration, and plastic pollution in our environment.



Industry is making five cellophane-thin arguments to portray plastic as part of the climate solution, distracting policymakers from the real solution of reducing plastic production.

MYTH #1

PLASTIC PRODUCTION CAN BE EMISSIONS-FREE BY USING CLEAN ENERGY AND CARBON CAPTURE AND STORAGE (CCS).

RESPONSE:

PLASTIC IS CARBON, SO ZERO-EMISSIONS PLASTIC IS IMPOSSIBLE.

Plastic is made from fossil fuels, and fossil fuel production is inherently emissions-intense. Proposals to produce “zero-emissions” plastic do nothing to address emissions from oil and gas drilling, transport, and refining.

Plastic production cannot be electrified; it relies on hydrogen and methane, which are themselves derived from fossil fuels. Most emissions come from on-site combustion of fuels in the manufacturing process, not from electricity drawn from the grid. Replacing that fuel with clean energy would not address the byproducts from chemical reactions in the plastic production process, such as the methane generated in steam-cracking oil and gas into the precursors to plastics like ethylene.

Contrary to industry assertions, carbon capture and storage (CCS) does not offer a technological quick-fix for process emissions. Equipping plastics production facilities with carbon capture technology is neither feasible nor effective. CCS projects have repeatedly failed to deliver promised reductions. The technology remains unworkable at scale, prohibitively expensive, and ill-suited for many industrial applications, including in the chemicals sector. A recent study of the potential for CCS to abate industrial emissions in the U.S. found that carbon capture was economically viable in less than 10% of the 1,500 industrial facilities initially considered, even when subsidies were taken into account. CCS dramatically increases energy use, exacerbating pollution in fenceline communities, while creating new environmental, health, and safety risks, such as lethal explosions and leaks from CO₂ pipelines.

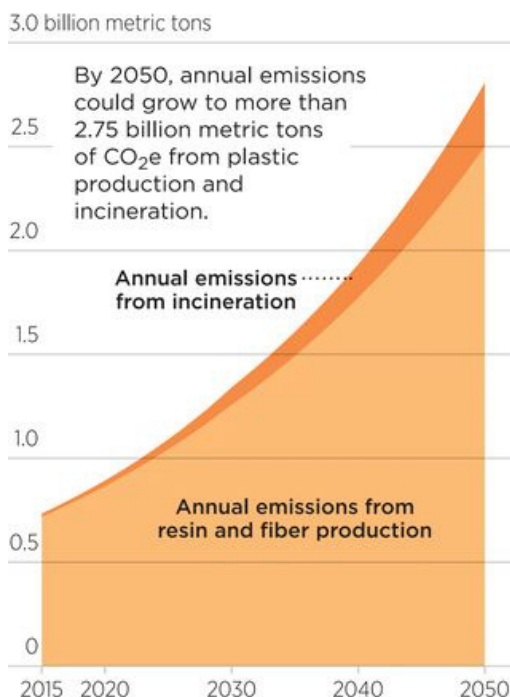
TAKEAWAY: THE ONLY WAY TO ZERO OUT EMISSIONS FROM PLASTIC IS TO ZERO OUT PLASTICS.

MYTH #2

PLASTIC WASTE CAN BE A CARBON-FREE FUEL.

RESPONSE: BURNING PLASTIC RELEASES ITS CARBON, A PROCESS COMMONLY KNOWN AS “INCINERATION.”

Annual Plastic Emissions to 2050



Using plastic waste as an energy source is no better for the climate than using other fossil fuels. Waste-to-energy is just incineration by another name: Burning plastic emits 2.9 kg of CO₂e for every kg of plastic burned. Converting plastics to synthetic fuels—via pyrolysis, gasification, or other “chemical recycling” techniques—and then burning them just adds another energy-intensive step to the incineration process.

Proposals to turn plastic waste-derived synthetic fuels into hydrogen do little more than displace emissions from one process to another. These emissions are likely as bad as or worse than simply burning the plastic to begin with. A recent study showed that so-called “blue hydrogen”—hydrogen produced from methane—generates more greenhouse gases than burning the methane or other fossil fuel directly as an energy source. Hydrogen drawn from the cracking process is no cleaner, as it is similarly fossil-derived.

TAKEAWAY: IF WE DON'T WANT ADDITIONAL GREENHOUSE GASES, WE SHOULDN'T BURN PLASTIC.

MYTH #3

PLASTICS CAN BE MADE WITHOUT OIL & GAS AND BECOME A CARBON SINK.

RESPONSE: TRADITIONAL PLASTIC IS BAD FOR THE CLIMATE; PLASTIC MADE FROM CCS & HYDROGEN COULD BE WORSE.

Making plastics from carbon dioxide and hydrogen has been pitched as a “net zero” win-win. According to proponents, carbon captured from other emissions sources can replace fossil feedstocks to make plastic, and those plastics then act as a “carbon sink.” But making plastics from captured carbon dioxide neither makes those plastics “clean” nor locks away the carbon for good, as all plastic releases its embedded carbon when it is incinerated or degrades.

The process of capturing carbon dioxide and producing the hydrogen generates carbon emissions, producing no net benefit when compared to virgin fossil fuel plastic production. Proposals to make plastics from atmospherically captured carbon dioxide, obtained from direct air capture (known as “DAC”) are well beyond the realm of economic viability. Moreover, the massive amounts of energy required to power DAC would either come from fossil fuels—resulting in a massive new source of greenhouse emissions—or would require enormous diversions of renewable energy that could otherwise be used to avoid carbon emissions. Furthermore, many additives essential to the plastic production process are themselves derived from fossil fuels, so it is fanciful to think that plastic can be “fossil-free.”

Even if it were feasible to produce plastic at scale without carbon emissions, plastic itself is not a carbon sink, because plastic eventually releases its carbon when it is burned or breaks down over time.

TAKEAWAY: PLASTICS ARE NOT A CARBON SINK, AND CARBON DIOXIDE IS NOT A VIABLE OR CLEAN REPLACEMENT FEEDSTOCK FOR PLASTIC PRODUCTION.

MYTH #4

PLASTIC POLLUTION WILL BE MITIGATED WITH OFFSET SCHEMES & GREEN CREDITS.

RESPONSE: IT IS NOT POSSIBLE TO OFFSET PLASTIC’S GREENHOUSE GAS FOOTPRINT, EITHER TODAY OR IN THE FUTURE.

The idea of offsets is that activities which pull carbon dioxide out of the atmosphere (or prevent it from being emitted) compensate for ongoing emissions. Offsetting is a fundamentally flawed concept in a climate-constrained world. It does not work in practice, and its application to the plastics industry is no exception.

Multiple scientific studies have shown that most offset projects do nothing to actually remove carbon from the atmosphere. For example, the U.N.’s carbon market was for years dominated by projects that created refrigerant gases solely in order to destroy them and collect carbon credits. In the U.S., offset credits have been awarded to forests that were never in danger of being cut or had already burned down. Other offset credits have funded land grabs of Indigenous land or displaced waste pickers while increasing emissions.

Even if offsetting worked properly, we cannot physically plant that many trees. Plastic’s lifecycle emissions in 2021 alone would need a new forest the size of Cyprus. By 2050, a forest almost the size of Belgium would have to be planted *every year* to keep up with the growth in plastic emissions. Such endeavors would be not only infeasible but also inhumane, given the implications for food security, water supply, and other land uses. Technological approaches are even more inadequate. In 2021, the total capacity of Direct Air Capture is about 12,000 tons CO₂ per year—just 0.0013% of plastic’s emissions in that year. As discussed above, DAC’s enormous energy requirements undercut any carbon removal benefit it might provide.

Globally, about 2.1 Gt of offset credits have been issued over the last 25 years— including all the fraudulent ones. Meanwhile, left unchecked, plastic emissions could total 56 Gt by 2050. And the cement, steel, shipping, and aviation industries are all also relying on offsets to claim emissions reductions. Offset markets are orders of magnitude too small to offset these industries, and attempting to scale them up will only exacerbate the problems of fraud and creative accounting.

TAKEAWAY: TRADITIONAL PLASTIC IS BAD FOR THE CLIMATE; PLASTIC MADE FROM CCS & HYDROGEN COULD BE WORSE.

MYTH #5

BIOPLASTICS WILL SOLVE THE PROBLEM.

RESPONSE: PLASTICS MADE FROM PLANT FEEDSTOCKS ARE STILL PLASTICS, AND WILL REQUIRE CARBON-INTENSIVE INDUSTRIAL AGRICULTURE.

“Bioplastics” refers to plastics made entirely or partially from biological feedstock, such as corn or potato starch. But bioplastics are not emission-free. Replacing petroleum with industrial agriculture has its own large carbon footprint. According to a Nature Climate Change study, “a complete shift of the plastics production of approximately 250 million tonnes to bio-based plastics would require as much as 5% of all arable land.” Such increased demand for arable land can lead to deforestation and food insecurity.

An accounting loophole applied to bioplastics underestimates the carbon footprint by overlooking emissions from biomass production, land use, and end-of-life treatment. A full life-cycle accounting shows that bioplastics produce no advantages for the climate, have a toxic production process, and increase land and water use, energy consumption, eutrophication, and acidification.

TAKEAWAY: BIOPLASTIC IS STILL PLASTIC. AND PLASTIC IS CARBON.

REAL CLIMATE ACTION BEGINS WITH A COMMITMENT TO ACHIEVING REAL ZERO, NOT “NET ZERO.”

SUMMARY

Plastics are a case study of how the “net zero” concept is being used to greenwash business-as-usual practices and divert attention from actual climate solutions. The real solution to plastic’s greenhouse gas problem is simple: Make far less of it. “Net zero” proposals that suggest different feedstocks, rely on different energy sources, promise to capture the emissions, or claim credits against ongoing emissions are all distractions from the fundamental truth that plastic production is climate destruction. These “net zero” schemes are nothing more than delay tactics and should be discarded as such.

Industry claims made in the name of “net zero” perpetuate the plastic industry, which fuels the climate emergency. A dramatic reduction in plastic manufacturing will reduce emissions, reduce toxic impacts on frontline communities, reduce plastic pollution in the environment, and cut off the oil and gas industry’s financial lifeline. Real climate action begins with a commitment to achieving real zero, not “net zero.”

