

RESEARCH KEY

Because greenhouse gases are colorless and odorless, it can be difficult to imagine what a ton (or many tons) of these emissions look like or do, especially on a comparative scale. To assist with this difficulty, this report uses a symbol representing the amount of carbon dioxide equivalent (CO₂e) released by a typical 500-megawatt coal-fired power plant (2 million tons in 2020).

CO₂e is the shorthand way of expressing “Carbon dioxide equivalent.” The term was adopted by the U.S. government as a way of comparing the global warming potential of any given greenhouse gas to that of carbon dioxide.

SUMMARY OF FINDINGS

The New Coal: Plastics & Climate Change is a comprehensive account of the United States plastics industry’s contributions to the climate crisis. Using the coal-fired power industry as a benchmark, the report examines ten stages in the creation, use, and disposal of plastics. Key findings include:

Plastics manufacturing is currently a significant source of greenhouse gas emissions in the United States. More than 130 plastics facilities and related power plants report their emissions to the U.S. Environmental Protection Agency (EPA), providing a baseline figure that at least 114 million tons of carbon dioxide-equivalent (CO₂e) gas are released from them per year. This is roughly equivalent to 57 average sized (500-megawatt) coal-fired power plants.

The petrochemical industry’s plastics infrastructure is expanding, and emissions are slated to increase dramatically. At least 42 plastics facilities have opened since 2019, are under construction, or are in the permitting process. If they become fully operational, these new plastics plants could release an additional 55 million tons of CO₂e gases – the equivalent of another twenty-seven 500-megawatt coal-fired power plants – by the year 2025.



Each shaded symbol represents 2 million tons of greenhouse gas emissions from current plastics industry activities. This is the same amount released by a typical 500-megawatt coal-fired power plant in 2020.



Each unshaded symbol represents 2 million tons of potential greenhouse gas emissions from planned industry expansion by the year 2025.

All weights in this report are measured in U.S. tons (also called ‘short’ tons), not metric tons.

The health impacts of emissions released by the plastics industry are disproportionately felt by low-income communities and people of color. More than 90% of the climate pollution that the plastics industry reports to EPA occurs in 18 communities, mostly along the coastlines of Texas and Louisiana. People living within 3 miles of these petrochemical clusters earn 28% less than the average U.S. household and are 67% more likely to be people of color.

“Chemical recycling” shares more in common with incinerating than recycling waste. While the industry has long made promises about plastic’s recyclability, in truth, less than 9% of plastic is recycled. In response to criticism, the industry has issued new versions of these old promises, offering to build infrastructure that it describes as “advanced recycling” or “chemical recycling.” These facilities do not recycle, however. Most spend vast amounts of energy catalyzing chemical changes designed to turn plastics into more burnable fuel. The burning of plastics made in the U.S. already releases an estimated 15 million tons of greenhouse gasses. With this process, it will release far more.

The New Coal: Plastics & Climate Change identifies other significant sources of greenhouse gas releases, some relatively obscure. For example, each year, at least 27 million tons of CO₂e gases escape from foamed plastic insulation into the atmosphere.

Much of the ongoing buildout is export-oriented. Exports of gases, resins, and other feedstocks for plastics manufacturing, and imports of overseas plastics and related chemicals, are causing at least 41 million tons of CO₂e to be released per year.

Overall, this report finds that **the U.S. plastics industry is responsible for at least 232 million tons of CO₂e gas emissions per year.** This amount is equivalent to the average emissions from 116 average-sized (500-megawatt) coal-fired power plants in 2020. As the plastics industry continues to build infrastructure for export and production, its CO₂e contributions will increase. As power plants close and petrochemical infrastructure expands in the U.S., the plastics industry's contribution to climate change will exceed that of coal by the year 2030⁷.

Reports generated by the plastics industry are incomplete, and consequently understate the quantities of gases, especially methane gas, it releases. Industry reports are incomplete and the gap in data between what they report and the gases actually released conceals acute short-term implications for the climate. Most significantly, neither fossil fuel producers nor pipeline operators account for leaks that transpire during the manufacture or transport of feedstock, though such leaks are a regular occurrence with regular, measurable outcomes.

By actual weight, the extraction of fracked gases in the U.S. for plastics production at home and abroad releases at least 1.5 million tons of leaked methane each year. Because methane lingers for a dozen years in the atmosphere⁸, these leaks are additive. They accumulate over time.

In the standard EPA greenhouse gas accounting method, methane is considered to be 25 times more harmful than carbon dioxide, so 1.5 million tons of leaked methane has the impact of 37.5 million tons of CO₂e gas releases -- about what is released by nineteen 500-MW coal-fired power plants.

This analysis is a floor, not a ceiling, of the climate impacts from methane leakage. Methane's greenhouse gas effect is more than three times worse during the 12 years that this gas remains in the atmosphere, when it has at least 84 times the climate impact of carbon dioxide. Using that factor, the impact of methane leakage from plastics demand increases dramatically, to 126 million metric tons of CO₂e gases.

This report's conclusions are based on an examination of these ten high-impact stages of plastics production, use and disposal:

1. Fracking for plastics.
2. Transporting and processing fracked gases.
3. Ethane gas crackers.
4. Other plastics feedstock manufacturing.
5. Polymer and resin manufacturing.
6. Exports and Imports.
7. Foamed plastic insulation.
8. "Chemical Recycling."
9. Municipal Waste Incineration.
10. Plastics in water.

For further details, please see Appendix 1, the Plastics & Climate Change Spreadsheet, which provides a facility-by-facility accounting of emissions. Appendix 2 explains the Methodology behind this report's calculations. Appendix 3 is a Glossary of Terms. Appendices are available along with this report on the Beyond Plastics [website](https://www.beyondplastics.org/plastics-and-climate) <https://www.beyondplastics.org/plastics-and-climate>.