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Alliance of Mission-Based Recyclers

Chemical Recycling Will Not Solve Our Plastics Problem

Why plastics-to-fuel is a false solution and how to evaluate the viability of emerging chemical technologies for plastics-to-plastics recycling.

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Members of the Alliance of Mission-Based Recyclers (AMBR) started some of the first recycling programs in the US and have decades of experience collecting and marketing plastics for recycling. We fully recognize the need for new solutions to improve plastics recycling and reduce plastic production. However, most chemical recycling technologies will do little to achieve these goals.

AMBR members collect, sort, and recycle plastics every day, and we know firsthand the limitations of the plastics recycling system. Mechanical recycling in the US has not and cannot significantly stem the tide of ever-increasing plastic production and waste. While there is substantial room for new processes and technologies to improve our current system, ultimately **we cannot recycle our way out of our plastics problem.**

THE TRUE END GOAL: REDUCE FOSSIL FUEL CONSUMPTION

Recycling plastics, by itself, is not the end goal. It is only an interim step toward a more sustainable and just circular economy. The role of plastics recycling is to serve as part of a larger systemic approach to reducing our dependence on fossil fuels and to keeping carbon in the ground. **Both chemical recycling and mechanical recycling must be examined through the lens of reducing fossil fuel consumption, not just as a means toward better management of plastic waste.**

CHEMICAL RECYCLING WILL NOT FIX THE RECYCLING SYSTEM

Chemical recycling, or "advanced recycling," is yet another false promise put forth by the petrochemical industry of new technology to "solve" recycling after decades of undermining plastics recycling. These technologies ignore the fundamental systemic problems facing plastics recycling. **Until we address the entirety of the systemic challenges underlying plastics recycling—including the economics, the collection and processing of materials, the limited end markets, and the role of manufacturers to design their products for recycling and with recycled content—no form of recycling will provide a viable large-scale solution to reducing fossil fuel consumption and plastic pollution.**

Reducing fossil fuel consumption should be the end goal of any plastics recycling effort.

MECHANICAL VS. CHEMICAL RECYCLING

MECHANICAL RECYCLING
Typically includes sorting, shredding, washing, and melting the plastics, and is the primary form of recycling used today. Only physical changes are made to the plastic and the polymer chains remain intact.

CHEMICAL RECYCLING
Recycling process where polymer chains are reduced to constituent components (monomers) through chemical processes. These components can be remanufactured into plastics, or used in plastics-to-fuel processes. Chemical recycling is not common today, though there are several projects under development.

TURNING PLASTIC INTO FUEL IS NEITHER SUSTAINABLE NOR CIRCULAR

Most chemical recycling technologies are pyrolysis or gasification techniques that have been known for decades. These facilities convert plastics to various grades of fuel and are classified as plastics-to-fuel, or PTF, technologies. When plastics are converted to fuels, those carbon molecules are only used once before being lost to the atmosphere. This is not circular and does not support the goal to decarbonize the global economy. Instead, plastics-to-fuel perpetuates the reliance on virgin fossil fuels to create new plastics. **There is no role for plastics-to-fuel in a circular economy and plastics-to-fuel should not be considered recycling.**

A small subset of chemical recycling technologies, such as purification and depolymerization, have the potential to convert plastics back into new plastic products. **These plastics-to-plastics (PTP) recycling technologies have the potential to complement mechanical recycling programs, but they are also the least developed and most expensive chemical recycling processes.** They may play a role in reducing plastic pollution and fossil fuel use, but only when integrated into a larger systemic strategy to reduce, reuse, and then recycle necessary plastic packaging and products. AMBR recommends the following principles for evaluating if and when PTP technologies could fit into a circular economy for plastics.

GUIDING PRINCIPLES FOR ASSESSING PLASTICS RECYCLING SOLUTIONS

AMBR outlines the following principles to guide new investments, technologies, and policies to reduce plastic production, improve plastics recycling, and ultimately reduce plastic pollution, fossil fuel consumption, and climate pollution:

- **REDUCE FIRST.** Efforts to reduce our consumption of plastic must take precedence over efforts to improve recycling. AMBR does not support any efforts to expand either mechanical or chemical recycling for any material that has been identified by prominent organizations (such as the Ellen MacArthur Foundation) as an "unnecessary or avoidable" plastic, and/or has a viable waste reduction alternative, including materials such as single-use plastic bags and utensils.

- **STOP USING "CHEMICAL RECYCLING" AND "ADVANCED RECYCLING" AS BLANKET TERMS.** These terms cover a large swath of technology concepts and there needs to be a clear distinction between plastics-to-plastics (PTP) recycling and plastics-to-fuel (PTF) technologies, the latter of which is only an energy recovery process and not recycling. All chemical recycling processes should be distinguished by their specific processing technology, their end products, and their incoming feedstocks so that individual projects can be assessed independently on their own merits. **The blanket use of "chemical/ advanced recycling" enables companies to disguise PTF technologies as circular solutions when they are only waste-to-energy programs.**

- **NO PLASTICS-TO-FUEL.** There is no role for plastics-to-fuel in a circular economy and it should not be considered recycling. Turning plastic into fuel does not reduce the demand for virgin plastic. If our demand for plastic continues and even increases, as expected, and if existing plastic has been converted to energy, then manufacturers must use virgin plastic to make new products, continuing our reliance on fossil fuel extraction. The EU Environment Commission, Ellen MacArthur Foundation, ISO standards (18604:2013), and other

Turning plastics into fuels is not classified as recycling and is not considered part of the circular economy by the EU, ISO standards and other prominent groups.

prominent groups **do not consider PTF to be part of a circular economy and do not classify PTF as recycling.** These technologies are classified as "energy recovery," which is less preferable than recycling in the waste hierarchy. In addition to the environmental and social burdens resulting from the extraction of fossil fuels, PTF facilities place a heavy toxic burden on nearby communities and workers, impacting people along the entire system of processing the plastic waste and then managing the residual effluent and waste. **AMBR opposes legislation that defines pyrolysis or gasification as recycling** and supports the waste hierarchy that prioritizes reduction, recycling, and composting over energy recovery.

- **CRITERIA FOR VIABLE PTP RECYCLING.** Plastic-to-plastic (PTP) recycling technologies, such as purification and depolymerization, may have the potential to improve plastics recycling by increasing the quantity and quality of post-consumer recycled (PCR) resin used to make new products. AMBR encourages recycling operators and communities to use the following criteria if considering PTP technologies:

  - Require a transparent environmental and human health review of the process and facility to be used;
  - Ensure that this process will address a gap in recycling that is not already being filled by mechanical recycling or provide a complementary technology that enhances the yield or quality of mechanically recycled materials;
  - Require at least 75% of the scrap plastics will be recovered in the recycling process;
  - Possess and maintain a valid contact(s) with an end market or manufacturer(s) that utilize the recycled materials in new products or packaging;
  - Ensure the facility pays a fair price for the materials that, at a minimum, offsets the costs of transportation and covers the MRF's processing costs per ton.

- **PLASTICS RECYCLING WILL NOT SUCCEED WITHOUT SYSTEMIC CHANGES.** For any type of plastics recycling to be effective in reducing plastic pollution, fossil fuel extraction and protecting public health, we need to transform our entire system of plastics production and recycling, including:

    - Prioritizing plastic reduction, especially in the context of single-use packaging, over recycling and other end-of-life solutions;

    - Ensuring robust collection systems to effectively capture and process plastics for authentic recycling;

    - Mandating the use of post-consumer recycled content in new plastic products and packaging;

    - Transferring the costs of recycling from local governments and taxpayers to product manufacturers to fund the needed investment in recycling collection infrastructure and processing equipment;

    - Improving the economics of recycling by reducing or eliminating subsidies for virgin fossil fuel extraction—which requires incorporating the full life-cycle costs of plastic production, pollution, and waste, including the impacts to our climate, our air and water, ecosystems, and public health, into the price of the product;

    - Enabling greater collaboration and cost-sharing among all stakeholders throughout the life cycle of plastic products, including design, use, recovery, and remanufacturing; and

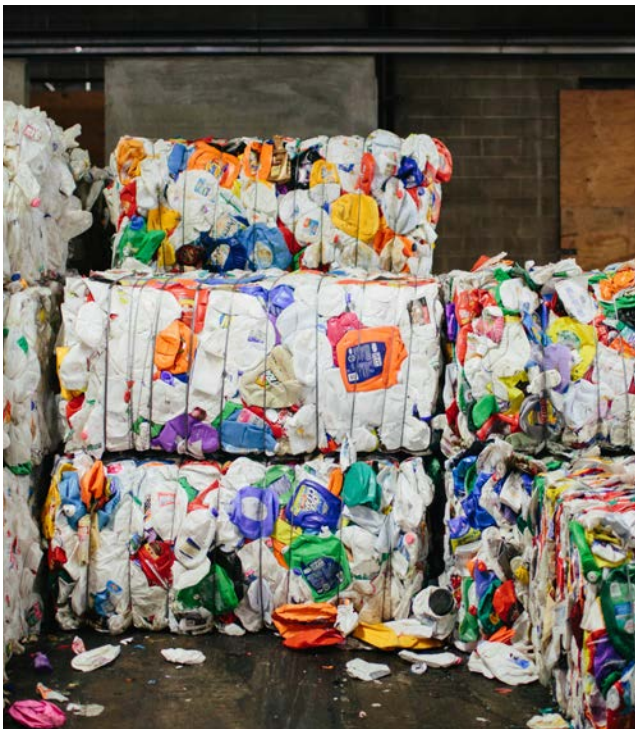
    - Enforcing transparent environmental and social safeguards to reduce pollution and health risks from petrochemical production, chemical recycling, and any resulting waste byproducts. This includes acknowledging and repairing the decades of disproportionate negative environmental and public health burdens faced by marginalized communities where fossil fuel extraction and plastics processing facilities have traditionally been located.

- **CHEMICAL RECYCLING IS A BARRIER TO BETTER SYSTEMIC SOLUTIONS.** Chemical recycling technologies will take significant capital, time, and policy support to get to scale. A more sustainable, climate-friendly circular economy could be better advanced through alternative investments of comparable size and time frame, including:

    - Avoiding and reducing the use of plastics through policies and investments in both reuse and refill infrastructure;

    - Policies, economic subsidies, and funding for collections and processing systems to maximize investments in the current recycling system; and

    - Prioritizing responsibly sourced, fully bio-based and certified-compostable polymers to replace petrochemical feedstocks, along with an expansion of composting infrastructure to recover these materials, convenient collection programs for compostable products funded by producers, and a transparent certification system managed by an independent third party.



It is questionable if any type of plastics recycling can survive in the long term against low oil prices without substantial policy interventions.

Learn more about AMBR and our work to improve plastics recycling and reduce plastic consumption at www.ambr-recyclers.org.

ABOUT THE ALLIANCE OF MISSION-BASED RECYCLERS

The Alliance of Mission-Based Recyclers (AMBR) was created by mission-driven, community-based nonprofit recycling and zero waste organizations in the US. Together we are guiding new recycling policies and infrastructure investments to rebuild credible, transparent recycling systems that serve as a bridge toward a circular economy as well as just, resilient local communities.

FOUNDING RECYCLING ORGANIZATIONS:

Eureka Recycling (Minneapolis, MN), Eco-Cycle (Boulder, CO), Ecology Center (Berkeley, CA), and Recycle Ann Arbor (Ann Arbor, MI).