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Alliance of Mission-Based Recyclers

The False Promise of Plastics-to-Fuel Technologies

Guidance for Legislators, Investors, and Municipalities

Plastics-to-fuel technologies are unproven, risky investments that perpetuate fossil fuel dependence and create a dangerous distraction from real recycling solutions that can be scaled up faster, cheaper, and far more effectively.

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EXECUTIVE SUMMARY

Public leaders around the globe are urgently pursuing options to address the growing health, environmental, and social harms caused by rampant plastic production.

The plastics and petrochemical industries, under intense public pressure to address plastic pollution, are aggressively promoting plastics-to-fuel (PTF) technologies as the foremost solution. These technologies are often deceptively branded as "chemical recycling" or "advanced recycling" even though they are clearly excluded from the definition of recycling by leading organizations and governments.[1, 2, 3]

The truth is that PTF concepts have failed to scale for decades and, in the process, cost American taxpayers and investors billions of dollars in lost investments. Their commercial viability remains questionable, and their environmental outcomes are dubious at best. Rather than lessen the problems of plastic pollution, these technologies present risky investments resulting in more plastic waste, increased plastic production, and the continued combustion of fossil fuels to make new plastics.

PTF technologies attempt to solve plastic pollution by making it "go away." This is solving the wrong problem. To address the climate crisis, we must create a circular economy where plastics are recycled into new products to reduce fossil fuel extraction and the resulting climate, environmental, and health impacts.

Converting plastics to fuel is directly contrary to our circular economy goal; the plastic is used only once and then destroyed, requiring the extraction of more fossil fuels to make new plastic products. Worse yet, these facilities will not reduce the amount of nonrecyclable plastic products. They will do just the opposite and perpetuate the need for disposable plastics so there is enough waste to run the facility.

MECHANICAL RECYCLING

- Reliable, effective investment
- Uses up to 88% less energy than virgin plastic production
- Reduces climate pollution by 60–70%
- Creates nine times more jobs than landfills
- Reduces water use and air pollution
- Advances a circular economy

VS

PLASTICS-TO-FUEL TECHNOLOGIES

- Risky financial investment
- Energy-intensive process
- Perpetuates reliance on fossil fuels
- Exacerbates unsustainable plastic production
- Disproportionately burdens communities of color
- Undermines circular economy and zero-carbon goals

AMBR'S GUIDE TO PLASTIC POLICY

WHAT TO SUPPORT

AMBR encourages the adoption of federal and state policies to strengthen recycling businesses and infrastructure that will:

- Eliminate unnecessary and problematic plastics that contribute significantly to ocean litter and contaminate recycling systems;
- Expand and modernize bottle deposit policies to maximize recycling rates for beverage containers;
- Create financially sustainable recycling systems through extended producer responsibility (EPR) policies;
- Standardize, scale up, and optimize existing plastics recycling collection and processing systems;
- Require post-consumer recycled content in plastic products to increase market demand for plastics and reduce the environmental impact of packaging;
- Drive investment in new packaging and delivery models that increase the prevalence of refillable and reusable packaging; and
- Require environmental justice assessments for industrial "chemical recycling" and solid waste facilities.

These established technologies and waste reduction strategies have significant room to grow, can be scaled quickly using proven solutions, create green jobs, and reduce fossil fuel consumption and its resulting climate, air, and water pollution.

WHAT TO REJECT

Any policy or investment in PTF technologies undermines urgently needed solutions to improve and grow authentic plastic recycling. **AMBR strongly urges state and federal legislators to reject any policies to promote, expand, or invest in PTF technologies.**

AMBR firmly opposes state or federal policies that:

- Include pyrolysis or gasification in the definition of recycling, including under the misleading blanket terms of "chemical recycling" or "advanced recycling";
- Reclassify pyrolysis, gasification, "chemical recycling," or "advanced recycling" as manufacturing rather than solid waste disposal to bypass stringent health and safety regulations on solid waste facilities;
- Provide tax credits or other subsidies to PTF technologies; or
- Permit PTF technologies to qualify for renewable energy credits or designation.

These policies will only escalate the negative climate, health, and social impacts of plastics production.

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 around 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 and just, resilient local communities.

KEY QUESTIONS FOR LEGISLATORS TO ASK ABOUT PTF PROPOSALS

- What is the level of oversight and regulation required for these new technologies, and are there ample local and state resources to provide this regulation?
- What financial and environmental safeguards are in place if the facilities exceed pollution thresholds, or if their operations or closures require future environmental cleanups?
- How is the health of the community being protected? What are emissions outside of "normal operating procedures"?
- What are the risks and impacts to the local community by importing plastic waste to run these facilities?
- How will these facilities impact Black, Indigenous, People of Color (BIPOC) and low-income communities? Have communities of color, disenfranchised communities, or otherwise disproportionately affected groups been involved as decision-makers?
- What other methods are currently being explored to address the production of plastic waste? Are there safer, more established and/or less costly or risky solutions that can be accelerated through other policies or public investments?
- Could these investments go further to support existing and proven recycling programs?

STOP USING "CHEMICAL RECYCLING" AND "ADVANCED RECYCLING" AS BLANKET TERMS

These terms cover a broad category of technology concepts. There needs to be a clear distinction between two fundamentally different types of facilities: those that produce recycled plastic monomers to be used again in new products (plastics-to-plastics [PTP] recycling facilities) and those that produce fuels to be combusted for energy (PTF technologies). Once plastics are converted to fuels, the material cannot be used again to make new products, which is why PTF is not considered recycling by the International Organization for Standardization (ISO), the US Plastics Pact, and other prominent groups.

PTF technologies are waste conversion technologies and should be called such, and not grouped under "chemical recycling." Only PTP facilities would be considered a form of recycling. All chemical recycling processes should be distinguished by their specific processing technology, end products, and incoming feedstocks so that individual projects can be assessed independently on their own merits and not lumped into a broad category of chemical processes.

Authentic recycling solutions have proven environmental, social, and economic benefits compared to the significant financial, health, and climate risks created by plastics-to-fuel technologies.

PLASTICS-TO-FUEL TECHNOLOGIES DO NOT REDUCE PLASTIC POLLUTION

In 2018, Renewology promised to convert Boise, Idaho's hard-to-recycle plastics into diesel fuel. It was one of the most highly promoted PTF projects and touted as an example of the new wave of "chemical recycling" facilities in the US. Within a year, the effort ground to a halt as trash bags piled up around the facility.

The failed facility is no anomaly–at least four high-profile "chemical recycling" projects have been dropped or indefinitely delayed over the last two years because they were not commercially viable.

Plastics-to-fuel technologies include techniques such as pyrolysis and gasification, which use high temperatures to convert discarded plastics to diesel, jet fuel, or other fuel products. Though hailed by the petrochemical and plastics industries as the leading solution to the plastic pollution crisis, these technologies will not reduce plastic pollution, decrease our consumption of fossil fuels or the resulting air, water, and climate pollution, or accelerate the transition to a circular economy or a zero-carbon future.

Instead, these technologies are likely to further increase the toxic environmental and social burdens of plastic production and waste, pose a risky financial investment to communities and states, and may trap already marginalized communities into becoming a dumping ground for plastic waste.

AMBR does not support PTF technologies due to economic, environmental, and social concerns. PTF technologies:

- Present risky financial investments due to unproven technology;
- Create health and environmental risks, especially to overburdened communities, and pose health risks to vulnerable communities;
- Do not support a circular economy;
- Undermine investments in mechanical recycling;
- Do not support a zero-carbon future;
- Perpetuate more plastic waste; and
- Undermine public health regulations which could leave a toxic legacy.

PRESENTS RISKY FINANCIAL INVESTMENTS

Despite nearly five decades of trying to develop pyrolysis technologies to scale, most technologies remain at the pilot stage due to economic challenges and uncertainties. Investing in these unproven technologies risks squandering taxpayer dollars, both by subsidizing enterprises with highly questionable viability today and by saddling the public with the costs of fixing broken infrastructure and cleaning up pollution in the future.

Since the 1970s, efforts to process plastics or mixed waste into fuels have failed to achieve long-term commercial viability on an industrial scale.[4] There have been over 35 PTF projects rolled out in the US since the early 2000s, yet only three are currently commercially operational, and it is estimated that these projects have lost over $2 billion in public and private investment.[5]

The economic challenges facing PTF technologies far exceed those challenges that currently impede mechanical recycling technologies. PTF technologies face several formidable financial challenges in order to grow from lab scale to commercial operations, including:

- Higher capital and operating costs relative to traditional recycling;

- Limited to no collection infrastructure to collect sufficient quantities of high-quality plastic feedstocks needed to achieve economies of scale; and
- Low prices and subsidies for oil and natural gas extraction that make it cheaper to use virgin fossil fuels than recycled plastics as feedstocks, creating a weak market for recycled monomers or other outputs from PTF facilities.[6]

PTF facilities have failed to scale because of the economic and operational trade-offs between how much energy and cost is needed to run the process and the quality of the outputs produced. It remains questionable if new pyrolysis facilities can meet the strict specifications of steam crackers in practice.[7,8] Even the most potentially viable "chemical recycling" technologies are at least a decade from commercial viability, at best. In addition to economic viability, these facilities still need to demonstrate net-environmental gains.[9]

CREATES HEALTH AND ENVIRONMENTAL RISKS

Along the lower Mississippi River in Louisiana is a petrochemical corridor known as "Cancer Alley." Nearly 150 oil and gas facilities built in the parish have resulted in air and water pollution, and elevated risk of cancer, respiratory illnesses, and other diseases in the predominantly African American community.[10]

Existing pyrolysis and gasification facilities have been linked to hazardous emissions that pose health risks to workers and nearby residents.[11] Gasification of plastic produces phthalates, bisphenol A (BPA), polybrominated diphenyl ethers, toxic brominated compounds, and polycyclic aromatic hydrocarbons (PAHs), many of which are mutagens, carcinogens, and disruptive to respiratory or neurological systems.[12] Toxic additives and contaminants that currently exist in plastic products and packaging will end up in one or more of the outputs from PTF facilities, such as the air emissions, liquid effluent, or solid char. These toxins include BPA, cadmium, benzene, brominated compounds, phthalates, lead, tin, antimony, and volatile organic compounds (VOCs).[13]

While emerging "chemical recycling" technologies claim to be safer than previous pyrolysis facilities, there is no reliable data to support this. With only a small handful of commercial plants in operation, there is only lab-scale data or estimated emissions calculations on the health and environmental impacts of these emerging technologies. **Lab-scale data is not sufficient proof of how these facilities will operate at scale given the past health risks with pyrolysis, gasification, and petrochemical facilities.**[14]

These potential health and environmental risks are intertwined with issues of environmental justice and environmental racism. For economic and regulatory reasons, new PTF facilities are most likely to be co-located near existing petrochemical facilities.[15] Adding another industrial facility with potentially toxic air and water emissions will further increase the harm done to communities that are already subject to disproportionate and cumulative environmental burdens, such as "Cancer Alley."[16] It is critical that communities consider both the health impacts of a PTF facility on its own as well as the cumulative impact that a new facility may have upon existing air quality. In addition to any environmental impact assessments, state and/or local governments should also conduct an environmental justice analysis on any proposed "chemical recycling" facility and should reject any facility that will have a disproportionately negative impact on overburdened communities.

UNDERMINES A CIRCULAR ECONOMY

There is no role for PTF in a circular economy, therefore it should never be considered recycling. In a circular economy, materials such as paper, plastics, and metals are used over and over again to create new products, reducing the extraction and use of natural

resources. Yet when plastics are converted to fuel, they cannot be reused again, and product manufacturers must continue to use virgin fossil fuels to make new plastic products and packaging. PTF directly contradicts the goal of a circular economy by destroying resources and perpetuating the ongoing reliance on nonrenewable virgin oil and natural gas consumption. PTF should never be considered recycling and should only be classified as a form of energy recovery, which is recognized as less desirable and a lower priority than recycling by nearly every regulatory agency. Numerous leading policies and organizations specifically identify PTF as energy recovery and not a form of recycling, including the ISO standards, US Plastics Pact, EU Environment Commission, and the Ellen MacArthur Foundation.[17, 18, 19]

Not a dumping ground for other states' waste: South Carolina state Rep. Mandy Powers Norrell defeated a bill to support PTF in her state because of concerns about the amount of plastics that would be dumped into South Carolina and the lack of responsibility that the companies would have if a cleanup was required.[20]

UNDERMINES INVESTMENTS IN MECHANICAL RECYCLING

Based on current recycling efforts, it is unlikely that there will be enough recycled plastic collected by 2025 to meet the growing demands of consumer goods companies that have pledged to use more recycled content in their products.[21] PTF technologies will directly compete against mechanical recycling and could steal away plastics that could have been viably recycled for the one-time-only use of fuel production. Independent market analysis of "chemical recycling" casts doubt on the ability of PTF technologies to coexist with traditional mechanical recycling because of the competition over the same feedstocks and the need to pay back the capital investment in PTF facilities.[22]

Further, the continuous need to feed PTF facilities with disposable plastics will create a financial barrier and stifle innovation and other capital investments in mechanical recycling, more sustainable packaging innovations, and new business models around reuse and refill. This is similar to how waste incineration facilities that require a consistent input of trash have been proven to compete directly against mechanical recycling in order to sustain enough materials coming into the facility.[23]

Gasification, a plastics-to-fuel technology, produces phthalates, bisphenol A (BPA), polybrominated diphenyl ethers, toxic brominated compounds, and polycyclic aromatic hydrocarbons (PAHs), many of which are mutagens, carcinogens, and disruptive to respiratory or neurological systems.

NOT COMPATIBLE WITH ZERO-CARBON FUTURE

PTF technologies fail on multiple fronts to advance a zero-carbon future. First, "chemical recycling" is more energy intensive than mechanical recycling, which means mechanical recycling is the preferred approach to reducing energy consumption and greenhouse gas emissions.[24] Assessments of "chemical recycling" have found **"No PTF technology can currently offer a net-positive energy balance, and there is no evidence to predict that this will be improved in the foreseeable future."** [25]

Second, PTF facilities use nonrenewable fossil fuel products to make energy, rather than renewable resources. **Plastics are derived from oil and natural gas, so any energy or fuels produced from plastics are just another form of nonrenewable, carbon-based energy.** Fuels produced from PTF facilities are combusted like other conventional fossil fuels, leading to climate pollution, air and water pollution, and all the known environmental and health concerns caused by burning fossil fuels. The world is increasingly moving away from fossil fuels and setting ambitious goals for a zero-carbon economy. Investing in PTF technologies undermines global efforts to reduce the use of carbon-based fossil fuels.

The definition of recycling should exclude the production of fuel or fuel products, such as this definition of recycling used by the US EPA: a "series of activities by which discarded materials are collected, sorted, processed, and converted into raw materials and used in the production of new products. Recycling excludes the use of these materials as a fuel substitute or for energy production." [26]

PERPETUATES MORE PLASTIC PRODUCTION AND DISPOSABLE PRODUCTS

Plastic production is estimated to triple by 2050, accounting for 20% of global annual oil consumption and 15% of the global carbon budget established to keep temperature increases below 2°C. [27]

PTF facilities will require large-scale capital investments and a steady input of waste plastics in order to operate. This will generate a perpetual demand for disposable plastics to feed into the facilities in order to create fuel and to pay back the capital investment. Large financial investments in PTF facilities will compete against incentives to phase out nonrecyclable plastics and strip funds away from innovative developments of sustainable alternatives such as reusable packaging systems.

Plastic is made from oil and natural gas. Fuel produced from plastics is just another form of nonrenewable, carbon-based energy.

PTF facilities need a constant feed of plastic waste, thus perpetuating more plastic waste, creating a financial barrier, and stifling innovation and investments in authentic recycling.

UNDERMINES PUBLIC HEALTH REGULATION

Legislation has been proposed in some states that would define pyrolysis or gasification as manufacturing, rather than solid waste disposal, or exclude post-consumer plastics from the definition of solid waste.[28] These types of policies seek to bypass much more stringent regulations on solid waste facilities that were designed to protect human health and the environment. Such legislative proposals could also allow these facilities to be exempt from the federal Resource Conservation and Recovery Act, which gives the EPA authority over hazardous waste.

Exempting PTF technologies from established solid waste regulation leaves communities vulnerable to significant financial, environmental, and public health risks. United States communities and taxpayers spent over $21 billion over the past 20 years to clean up industrial facilities that failed to meet environmental safeguards and/or operated without adequate financial reserves for post-closure remediation, despite existing Superfund regulations, and increasingly these costs are falling more and more on the local communities.[29] Without proper regulations to enforce current and future health and safety issues, communities could again be saddled with the costs of toxic environmental cleanups if these facilities fail to operate as promised.

MECHANICAL RECYCLING REDUCES PLASTIC POLLUTION

Done correctly, plastics recycling can work well and can be significantly scaled up to play a critical role in reducing plastic pollution, plastic waste, and fossil fuel consumption. Instead of pursuing unproven PTF and other technologies, **there is an abundant need to invest in the full potential of proven mechanical plastics recycling processors, businesses, and technologies.**

Such investments will increase recycling rates, create jobs, and bolster local economies without creating the unnecessary financial and health risks associated with PTF technologies Much more can be done at the local, state, and federal level to improve the collection, sorting, and use of recycled plastics that will deliver proven benefits to our environment, communities, and economies.

AMBR members represent pioneers of mission-driven, community-based nonprofit recycling and Zero Waste programs. With four decades of collective experience, we see first-hand the positive environmental and community impacts achieved by authentic recycling, including:

- Reduction of energy, fossil fuel use, and carbon pollution;
- Creation of jobs and local economic benefits; and
- Substantial opportunity for growth due to increased demand for recycled plastics.

WHAT IS PLASTICS RECYCLING?

MECHANICAL RECYCLING

Mechanical recycling is the predominant process to recycle plastics. Discarded plastics are typically sorted and washed, and then either shredded into flakes or melted into pellets, both to be remanufactured into new plastic packaging and products. Mechanical recycling does not change the chemical structure of the plastics, and the plastic polymer chains remain intact. Depending on the recycling process used, many plastics can be mechanically recycled more than once into new products or packaging.

"CHEMICAL" OR "ADVANCED RECYCLING"

"Chemical recycling" is a rarely used process with few operational plants, most of which are in the pilot-scale phase. These terms, often used interchangeably, refer to processes that change the chemical structure of plastic by breaking polymer chains into their constituent components, either by dissolving the plastic with chemical solvents or using high temperatures to break the polymers down into monomers. The resulting chemical products are most often used to create fuels that are burned for energy, known as PTF technologies.

"Chemical recycling" can also be used to create recycled plastic polymers for new plastic products, but these technologies are far less advanced and far fewer in number than PTF technologies. The blanket use of "chemical/advanced recycling" enables companies to disguise PTF technologies as circular solutions when they are actually a waste conversion technology.

California has several grant programs to invest in recycling, including the Recycled Fiber, Plastic, and Glass Grant Program, which aims to reduce greenhouse gas emissions and create jobs in disadvantaged and low-income communities. Program funding comes from sales of greenhouse gas emissions allowances auctioned off by the state as part of its cap-and-trade program.[30]

REDUCES ENERGY, FOSSIL FUEL USE, AND CARBON POLLUTION

Plastics recycling is a proven solution to reduce energy use, fossil fuel combustion, and GHG emissions. Recycled plastics can save 75-88% of the energy used to make virgin plastics, reduce GHG emissions by 60-70%, and use 45-60% less water than current virgin plastic production.[31]

CREATES JOBS, PROVEN ECONOMIC BENEFITS

Mechanical plastics recycling has proven economic benefits at the local, state, and national levels that can be realized today and quickly scaled in the coming years, compared to the possible and dubious projected economic benefits claimed by "chemical recycling" companies. Recycling already has significant economic benefits: US recycling and reuse account for 681,000 jobs, $37.8 billion in wages, and $5.5 billion in tax revenues.[32] **Doubling our overall recycling rate in the US, including significant investments in plastics recycling, would produce over $30 billion in economic benefits over 10 years,** including nearly 200,000 new jobs and $11 billion in wages.[33]

Mechanical plastics recycling creates an average of nine times more jobs per ton than landfills and has shown to be a valuable economic driver in many states.[34] For example, South Carolina invested strongly in plastics recycling and remanufacturing facilities and has successfully driven job growth and economic impact in the state. Over eight years, the recycling industry doubled its total economic impact from $6.5 billion to $13 billion and job growth grew 44%.[35]

Stronger recycling programs will also provide the US economy with **greater resilience in the supply chain.** Already 40% of the materials used today in US manufacturing come from recycled materials.[36] Recycling industries were declared essential during the COVID-19 pandemic for their role in providing recycled glass, plastics, paper, and metals to US manufacturing facilities to make critical medical, safety, and transportation supplies, among other common household goods.

SUBSTANTIAL ROOM FOR GROWTH

Mechanical recycling is currently underdeveloped and has significant untapped potential. Fewer than 30% of PET and HDPE bottles and jugs are recycled in the US, despite being the most recyclable plastics.[37] As projected, there is not a sufficient supply of recycled plastics to meet the expected demand coming from new minimum recycled content policies and voluntary pledges from consumer goods companies.[38] **Both recyclers and plastics industry representatives have publicly stated that mechanical recycling should be given priority over "chemical recycling" for existing materials.**[39] It is critical that we prioritize and invest first in proven mechanical recycling technologies that can be quickly implemented and expanded, rather than pursuing unproven and speculative chemical technologies.

Michigan recently invested over $97 million in state and private funds in recycling infrastructure to triple the state's recycling rate. The NextCycle Michigan initiative and the Renew Michigan Fund mark the largest push in the state's history to promote recycling activities to divert materials from Michigan landfills, boost local economies, and support reductions in greenhouse gas emissions.[40]

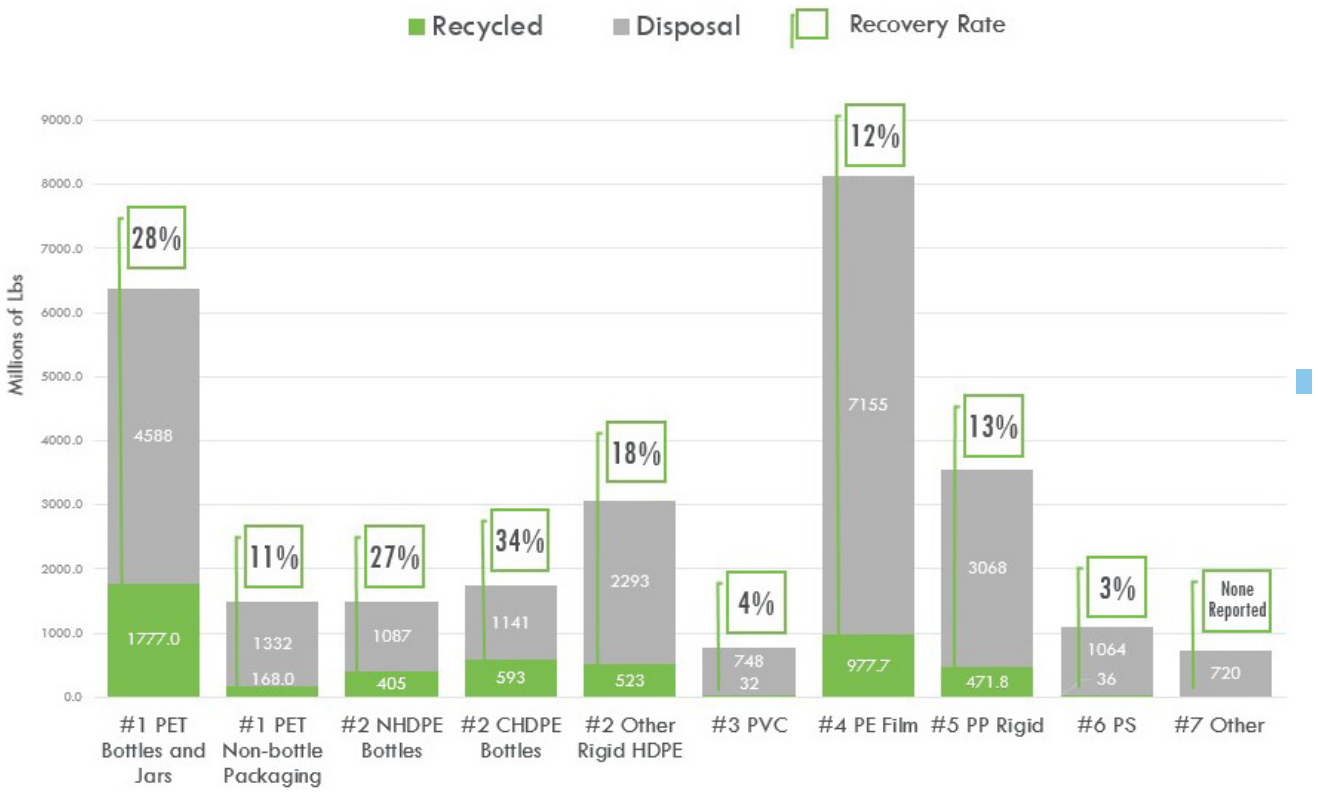


Figure 1: Recycling rate by plastic type in the US. Less than 30% of PET and HDPE–the most recyclable plastics–are recycled in the US. There is significant room to grow mechanical recycling for commonly recyclable plastics such as PET, HDPE, and PP containers. Figure from Resource Recycling Systems, Inc.[41]

Why Are So Few Plastics Recyclable?

Most plastics fail the basic recycling criteria.

BAD DESIGN

Plastic packaging contains toxic additives, dyes, labels, and other chemicals that contaminate new products.

FEW BUYERS

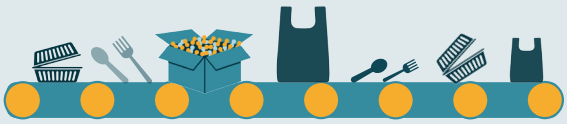
The plastics industry does not buy back enough recycled plastics. On average, plastic beverage containers are made from less than 10% recycled content.

LOW-QUALITY MATERIAL

Plastics degrade in quality each time they are recycled. Only a fraction of plastics are recyclable, and most of those are downcycled into products that cannot be recycled again.

COSTLY TO COLLECT AND SORT

Consumer brands constantly introduce new packaging with different resin types, shapes, colors, and chemical additives that are costly and complicated to collect and sort.



INSUFFICIENT MARKET VALUE

Subsidized fossil fuel prices make virgin plastics cheap to produce. The market value of recycled plastics does not cover the costs of collection and processing.

MISLEADING LABELING

The chasing arrows recycling symbol appears on almost all plastics, misleading consumers to believe they are recyclable.

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KEY POLICY TOOLS TO ADVANCE AUTHENTIC RECYCLING

The US recycles only 18% of plastic containers and packaging.[42] By comparison, more than 60% of rigid plastics are recycled in British Columbia, Canada, demonstrating that the US could triple its recycling rate using existing technologies and policies.[43] By enacting specific policies to advance mechanical recycling, much more can be done at the local, state, and federal levels to improve the collection, sorting and use of recycled plastics that will further deliver additional benefits to our environment, communities and economies. Priority policies to scale authentic recycling include the following:

EXTENDED PRODUCER RESPONSIBILITY

Extended Producer Responsibility (EPR) policies are widely recognized as the most impactful policy tool to develop a more cost-effective, financially sustainable model for funding recycling programs that will improve plastics recycling and drive more investments in plastics reprocessing.[44] EPR policies require product and packaging companies to fund recycling programs and invest in new recycling infrastructure. This will significantly expand access to recycling across the US while reducing the costs of managing plastics and other materials from local and state governments.

Over 40 countries currently have EPR policies for packaging and more than 150 leading businesses and other organizations from across the packaging value chain have officially endorsed EPR for packaging.[45, 46] Maine and Oregon adopted the first EPR policies for packaging in the US in 2021, and more than 10 states as well as the US Congress are actively pursuing legislation.[47, 48]

MINIMUM RECYCLED CONTENT

Minimum recycled content policies require manufacturers to use more post-consumer recycled materials in their products and packaging. These policies are proven to reduce the environmental impacts of plastic packaging and create a stronger, more stable demand for recycled plastic feedstocks that helps to grow recycling collection and processing programs and businesses. California and Washington have adopted policies to add more recycled plastic into beverage containers, plastic bags, and other products, and other states are actively following suit.[49, 50, 51]

In addition to recycled content requirements, strong state procurement guidelines that give preference to products made from high amounts of post-consumer recycled content are also effective policy tools to increase the demand for recycled plastics.[52] The proposed national RECYCLE Act would require the EPA to update federal procurement guidelines to drive the use of more recycled content. The Northeast Recycling Council is working with regional governments to increase their use of post-consumer plastic resin and is a good model for local and state agencies to use their procurement dollars to boost plastics recycling.[53, 54]

BOTTLE DEPOSIT SYSTEMS

A bottle deposit policy requires a minimum refundable deposit on beer, soft drinks, and other beverage containers to ensure a high recycling rate or reuse. Bottle deposit policies drive high recycling rates for beverage containers and produce a clean stream of recycled PET, glass, and aluminum to recycle back into beverage containers in a closed-loop process. AMBR strongly supports expanding

and modernizing bottle deposit policies across the US. We want to underscore further that bottle deposit policies and curbside recycling programs are complementary solutions, and both are needed to reduce plastic pollution. As such, it is critical for new bottle deposit policies to include a transition plan to allow curbside recycling systems to adjust operations to co-exist alongside bottle deposit policies.

REUSE/REFILL AND SOURCE REDUCTION

Waste reduction and greater utilization of reuse and refill models are where the greatest environmental protections and economic benefits are waiting to be tapped, yet these strategies are significantly underfunded and overlooked. There are five priority sectors with substantial opportunities to increase reusable and refillable packaging, including: (i) food service: take out, delivery of prepared meals, and meal kits; (ii) consumer food and beverage products; (iii) consumer cleaning products; (iv) consumer personal care products; and (v) transportation/shipping of wholesale and retail goods.

Model policies to drive more reusable and refillable packaging include:

- Update state procurement policies to give preference to reuse/refill programs;
- Set reuse/refill and waste reduction goals in state solid waste plans, aiming for 10% by 2024 and 20% by 2028;
- Regulate retail sectors that sell products in single-use formats, and set a reduce/reuse target for each retail product sector;
- Require reusable foodware for on-site dining;
- Reduce single-use accessories in take-out and delivery by requiring companies to offer these items only upon request; and
- Introduce charges for take-out disposables.[55]

ENVIRONMENTAL JUSTICE PROTECTION

The production and consumption of plastics products and packaging disproportionately negatively impacts BIPOC and low-income neighborhoods that are located near petrochemical facilities, along transportation corridors, and near waste disposal facilities. This has resulted in significantly higher incidence of disease and death for individuals in BIPOC and low-income neighborhoods.[56] We cannot allow this to continue.

States need to provide support for organizations working with national climate, environmental justice, and healthy community initiatives most detrimentally impacted by our current production facilities and waste infrastructure. As a first step, states can follow the lead of New Jersey and require an environmental justice analysis to determine whether new solid waste or industrial facilities will have a disproportionately negative impact on overburdened communities and reject new facilities that have an undue burden.[57]

Over 100 global companies support EPR policy as the only proven and effective tool to provide sufficient, ongoing, and dedicated funding to increase recycling, reduce plastic pollution and GHG emissions, and move toward a circular economy.

CONCLUSION

Plastics-to-fuel technologies will not reduce plastic pollution, decrease the consumption of fossil fuels or the resulting air, water, and climate pollution, or accelerate the transition to a circular economy or a zero-carbon future. Rather, these technologies are likely to further increase the toxic environmental and social burdens of plastic production and waste, pose a risky financial investment to communities and states, and may trap already marginalized communities into becoming a dumping ground for plastic waste.

Instead of pursuing these unproven technologies, there is an **abundant need for state and national policies to invest in proven mechanical plastics recycling processors, businesses, and technologies that will increase recycling and bolster local economic growth without creating the unnecessary financial and health risks associated with PTF technologies.**

AMBR supports the adoption of federal and state policies to strengthen recycling businesses and infrastructure that will:

- Eliminate unnecessary and problematic plastics that contribute significantly to ocean litter and contaminate recycling systems;
- Create financially sustainable recycling systems through EPR policies;
- Standardize, scale up, and optimize existing plastics recycling collection and processing systems;
- Require post-consumer recycled content in plastic products to increase market demand for plastics and reduce the environmental impact of packaging;
- Drive investment in new packaging and delivery models that increase the prevalence of refillable and reusable packaging; and
- Protect public health and prioritize environmental justice by requiring environmental justice assessments for industrial "chemical recycling" and solid waste facilities.

These proven recycling and waste reduction strategies have significant room to grow, can be scaled quickly using established technologies, will create green jobs, and will reduce fossil fuel consumption and its resulting climate, air, and water pollution. They represent the most comprehensive and effective solutions to address plastic pollution, plastic waste, and fossil fuel consumption, and can be immediately adopted and implemented at the local, state, and federal levels.

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