Report: Advanced Recycling of Plastics Reduces Greenhouse Gas Emissions, Fossil Energy Use

Advanced Technologies Contribute to Circularity

What does the research say?

To help recycle the 90% of plastics that aren't recycled today, billions of dollars in announced investments have been made over the last few years in advanced recycling (AR). Multiple AR technologies can process hard-to-recycle plastics that cannot feasibly be recycled through traditional methods. Since these advanced recycling technologies create raw materials that can be remade into new plastics and products, AR allows plastics to be reused again and again.

Since 2020, at least 13 research studies (Life Cycle Assessments, or, LCAs) measured the environmental impacts of AR technologies and facilities. A review of these LCAs (see report info below) found significant environmental benefits from AR.

KEY FINDINGS

The majority of LCA results indicates that AR technologies produce plastic and chemical products with reduced global warming potential[1] compared to products made from virgin resources.

AR can reduce CO2 equivalent emissions compared to today's typical end-of-life processes, such as landfill and waste-to-energy,

by more than 100%.

(Exceeds 100% due to credits earned from avoided products and/or energy, as per international standards.[2])

AR can reduce fossil energy use by

up to 97%

compared to landfilling.

MORE OBSERVATIONS

AR technologies are highly versatile.

They can process a wide range of used plastics to create a multitude of high value feedstocks for brand new chemicals and plastics.

All 13 LCAs were published since 2020 and represent

current/maturing technologies.

All 13 LCAs found that AR contributes to

to circularity for plastics.[3]

Report: Quantitative Comparison of LCAs on the Current State of Advanced Recycling Technologies, City College of New York, Earth Engineering Center, 2022.

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[1] Global warming potential measures the ability of a substance to trap heat in the Earth's atmosphere compared to CO2. For example, methane traps more heat than CO2, so it has a higher global warming potential.
[2] Adherence to a standard, such as International Standards Organization (ISO) or European equivalent (European Standards, EN).
[3] Circularity is defined by the preservation of "raw materials, components, and products (of finite resources), enabling their highest value and utility at all times." Report: "Through various recycling technologies ranging from mechanical recycling to advanced recycling…plastics can be reused to manufacture desired products rather than landfilling."