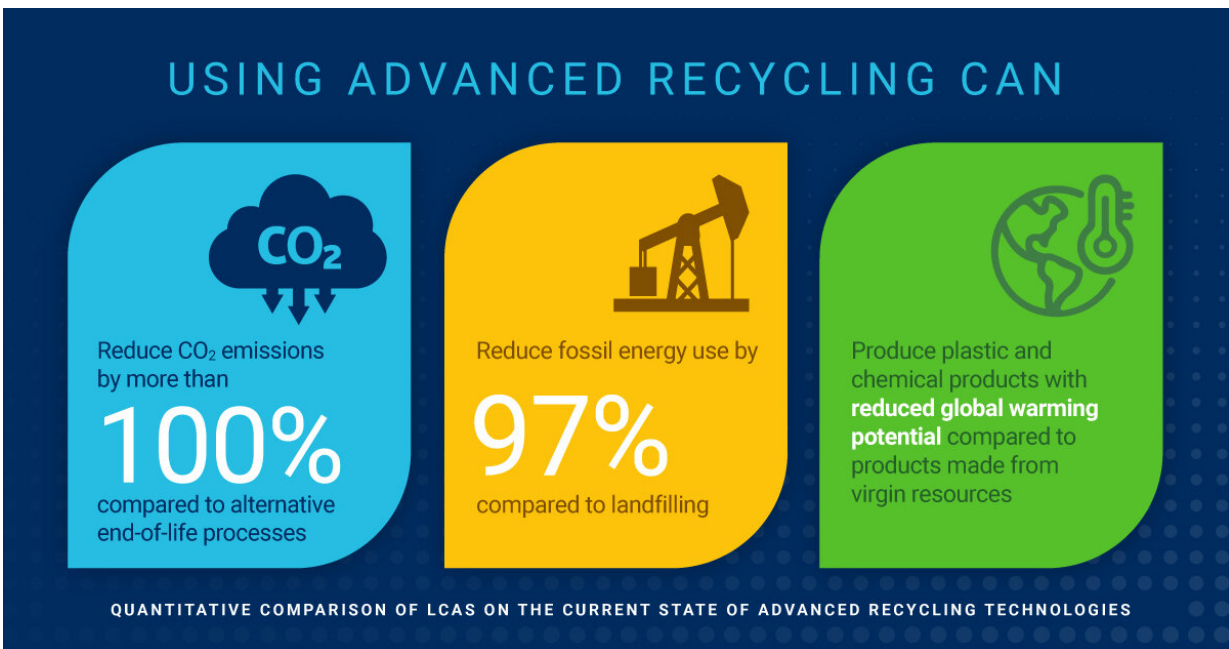


Advanced plastics recycling yields climate benefits

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Credit: City College of New York

The City College of New York Grove School of Engineering today released a new report which examined advanced recycling. The report concluded that advanced recycling helps avoid climate impacts, reduces demand for energy resources, and offers key tools for expanding the circular economy. The report was authored by Dr. Marco J. Castaldi, professor of chemical engineering and director of CCNY's Earth Engineering Center (EEC), and EEC research associate Lauren

Creadore.

The authors examined 13 recently completed life cycle assessments (LCAs) and found that advanced recycling can transform hard-to-recycle plastics into products with a smaller carbon footprint than those made from new resources. The processes also reduce [energy use](#) and [greenhouse gas emissions](#) compared to conventional end of life methods, such as landfilling and waste-to-energy. Use of advanced recycling contributed to circularity for plastics in all 13 LCAs.

Specifically, the [report](#) found that advanced recycling technologies can:

- Produce plastic and chemical products with a reduced global warming potential compared to products made from virgin resources.
- Reduce the need for fossil [energy resources](#) by up to 97% compared to landfilling.
- Reduce CO₂ equivalent emissions by more than 100% compared to typical end-of-life processes when accounting for displaced demand for chemical products and energy.

"As advanced recycling becomes increasingly efficient, it is poised to play a major role in achieving global sustainability goals," said Castaldi. "It can transform hard-to-recycle [plastics](#) into a multitude of high-value feedstocks, reducing the need for fossil resources and limiting the environmental impact of waste management. Equally important, the data suggest that our transition to a more [circular economy](#) will dramatically improve climate outcomes."

"There's been significant investment and interest from companies and policymakers in advanced recycling," said Bob Hall at the American Society of Mechanical Engineers' Research Committee on Energy, Environment, and Waste. "Scientific studies like this one from CCNY,

coupled with engineering ingenuity can help inform and responsibly move us towards a more sustainable and circular future. As these technologies mature, it is imperative to conduct additional studies on advanced recycling that adhere to international LCA standards."

"ASME suggests that technologies that have current operating performance data and have a facility to visit should be given priority for future analyses," added Annette Scotto, ASME Chair of the Material and Energy Recovery Division.

More information: Report: [ccnyeec.org/wp-content/uploads ... AdvRecyclingLCAs.pdf](https://ccnyeec.org/wp-content/uploads/2022/10/AdvRecyclingLCAs.pdf)

Provided by City College of New York

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