Report: Environmental Footprint from Production of Plastics Shrinks

GHG Emissions, Energy Use Went Down Despite Increase in Production

Report findings: While demand increased for four common plastics over a decade+, the environmental footprint of their production shrunk, as measured by greenhouse gas emissions and energy use.

From 2005 to 2017, demand for many plastics rose significantly, driven by consumer and business demands for cars and trucks, new homes, wind turbines, solar panels, medical gear, aircraft, packaged goods, and other products that rely on plastics.

Conversely, greenhouse gas emissions (GHGs) and energy use from production of four common plastics went down during this period. Details below.

NEW REPORT COMPARED 2010, 2020 LCAS

Franklin Associates, a consulting firm with considerable experience in conducting Life Cycle Analyses (LCA), conducted LCAs on plastics in 2010 and 2020. The studies looked at the environmental footprint of multiple plastics (sometimes called "resins") and their precursors[1], using data from 2005 and 2017, respectively.

A new report, "A Decreasing Footprint," compared the two LCAs, looking at four resins.

- Low-Density Polyethylene (LDPE) used in film packaging and electrical wire insulation
- High Density Polyethylene (HDPE) used in multiple consumer goods and packaging
- Linear Low-Density Polyethylene (LLDPE) used in packaging, agricultural film, and power cables
- Polypropylene (PP) used in food packaging, car parts/batteries, and cold weather clothing

Specifically, the new report focuses on the changes over the decade+ in GHGs[2] and energy use associated with the production of these plastics.

Like many others, these LCAs begin with the extraction of raw materials and end with the plastic material (or resin) or resin precursor leaving the manufacturing facility, typically called a "cradle-to-gate" LCA.

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[1] Plastic resins are synthetic materials produced from polymers and molded into various shapes, whereas plastic resin precursors are chemical products used to produce plastic resins.

[2] As measured in Global Warming Potential, a commonly accepted calculation that aggregates various GHGs into a single number.
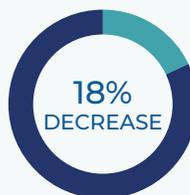
GHG reductions

The Report found that GHGs (per kilogram of resin production) decreased by 6 to 18% over the decade+.
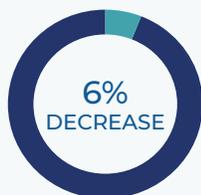
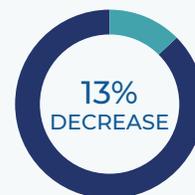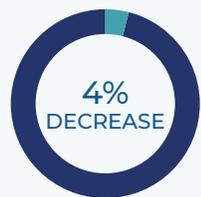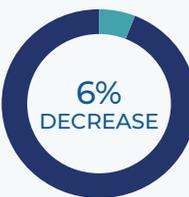| 6% DECREASE	10% DECREASE	18% DECREASE	13% DECREASE
LDPE	**HDPE**	**LLDPE**	**PP**

NOTE: Total GHGs from production of these resins also decreased significantly (see Report takeaways below for comparison).
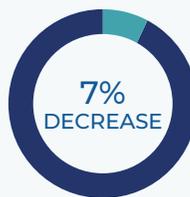
Energy use reductions

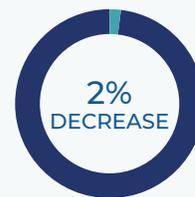Energy use (per kilogram of resin production) decreased by 2 to 7% over the decade+.

4% DECREASE	6% DECREASE	7% DECREASE	2% DECREASE
LDPE	**HDPE**	**LLDPE**	**PP**

The Report notes multiple reasons for the decreases in GHGs and energy use, such as changes in the type of fuel used and improved efficiencies in production processes.

REPORT TAKEAWAYS

- The environmental footprint from the production of common plastics is shrinking, as measured by GHGs and energy use.

- While the production of these four plastics increased over a decade+ by 4 billion+ pounds, associated GHGs decreased significantly – by the equivalent of removing one million cars from our roads for one year.

- The positive trend toward lower GHGs is expected to continue as production shifts to lower carbon fuel sources, including renewables.

- The positive trend toward lower energy use is expected to continue due to efficiency improvements in the production of resins and their precursors.

NOW WHAT?

The data from this Report are available in the U.S. Lifecycle Inventory Database, and the full studies are available on ACC's website. This information can help inform decision-making related to the environmental footprint of materials over their full lifecycles.

Indeed, this Report builds on decades of findings from multiple researchers that the use of plastic packaging and products can significantly reduce GHGs compared to alternatives.

Read the Report here.