



Sustainability in Action

POLYMER CENTER rPET FLAKE

Product Carbon Footprint

Summary Report

SEPTEMBER 2025



Introduction

Republic Services' Polymer Centers produce clear, bottle-grade plastic flake from materials collected from homes and businesses in the United States for use in sustainable packaging, enabling true bottle-to-bottle circularity. To understand the environmental benefits of our offering, we commissioned Sphera to conduct a cradle-to-gate product carbon footprint (PCF) study comparing the clear recycled polyethylene terephthalate (rPET) flake produced at our Las Vegas Polymer Center to representative rPET flake produced in the United States and in Asia for the U.S. market, and to virgin PET produced in the U.S. and in Asia. The study analyzed Las Vegas Polymer Center operational data from January 1, 2024, through July 31, 2024.

Republic Services' clear rPET flake has significant advantages¹:



LOWER CARBON FOOTPRINT

On average, the global warming potential of rPET flake produced at the Las Vegas Polymer Center is 54% lower than the representative rPET flake alternatives evaluated, and 82% lower than the virgin PET alternatives.



BOTTLE-GRADE PRODUCT

Republic Services' rPET flake is bottle-grade, unlike most rPET produced from mechanical recycling, enabling bottle-to-bottle circularity.



INTEGRATED SUPPLY CHAIN

Republic Services manages post-consumer recycled material, from curbside collection to flake production, in contrast to imported rPET.



ENHANCED CIRCULARITY

The Polymer Center process also recovers and recycles non-PET materials from the stream that would otherwise be disposed of through landfill or incineration, further contributing to a circular economy.

Republic Services' lower-carbon-footprint rPET helps customers meet their need for high-quality recycled resin while also helping decarbonize their supply chains, leading to reduced environmental impact.

Findings

LOWEST CARBON FOOTPRINT OF EVALUATED PET

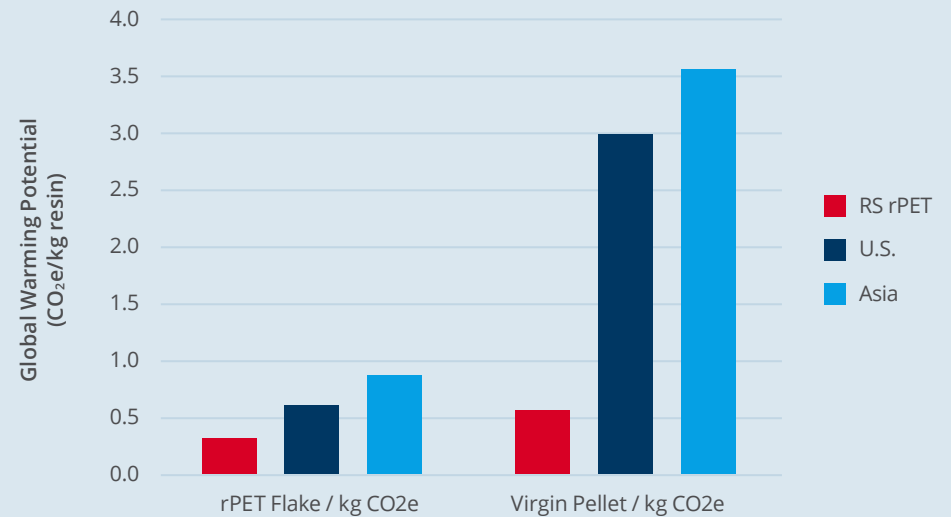
Republic Services is developing a national network of Polymer Centers to enable bottle-to-bottle circularity for PET, with our first two centers operational in Las Vegas and Indianapolis. There is growing demand in the marketplace for high-quality recycled plastics: Many consumer packaged goods (CPG) companies have set voluntary goals to increase their use of recycled content², and several states require post-consumer recycled content in single-use plastic packaging³.

The U.S. rPET market consists of domestically produced material and rPET exported to the U.S. from global producers. The comparative PCF study found that Republic Services' rPET produced at the Las Vegas Polymer Center has a lower carbon footprint (cradle-to-gate CO₂e) than the industry representative rPET produced in either the U.S. or Asia, and is well below virgin PET produced in the U.S. or India:

- **47% lower** than representative rPET in the U.S. market
- **62% lower** than representative rPET imported to the U.S. from Asia
- **81% lower** than representative virgin bottle-grade PET produced in the U.S. for the U.S. market
- **84% lower** than representative rPET manufactured in India and imported to the U.S. market

Reduction potential of rPET produced at Las Vegas Polymer Center compared to representative rPET and virgin PET

| | Flake | | Pellet | |
|--------------------------------|----------------------|-------------|----------------------|-------------|
| | CO ₂ e/kg | % reduction | CO ₂ e/kg | % reduction |
| Average RS | 0.332 | - | 0.564 | - |
| Representative US rPET | 0.627 | 47% | 0.859 | 34% |
| Representative Asia rPET | 0.873 | 62% | 1.104 | 49% |
| Representative U.S. virgin PET | - | - | 3.011 | 81% |
| Representative India PET | - | - | 3.565 | 84% |



2. <https://content.ellenmacarthurfoundation.org/m/528a7cd095787dec/original/The-Global-Commitment-2024-Progress-Report.pdf>

3. <https://plasticsrecycling.org/tools-and-resources/policy-hub/policy-priorities/recycled-plastic-content-requirements/>

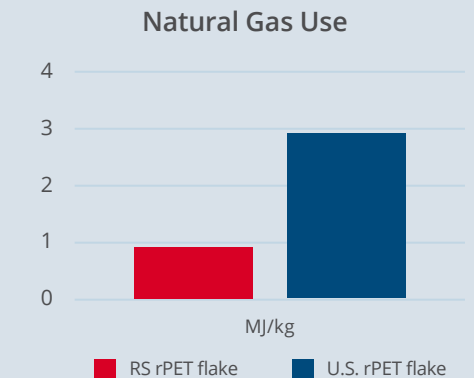
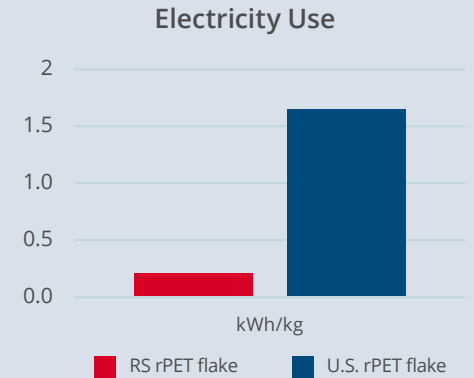
LOWER ENERGY USAGE

The lower emissions intensity of our rPET is principally associated with more effective energy usage at the Las Vegas Polymer Center:

- The patented equipment line is more efficient, using less electricity and thermal energy per kilogram of flake than other mechanical recycling processes.
- Processing is shared with other, non-PET materials recovered, which account for 30% of the energy load.
- The regional utility grid (Arizona-New Mexico) has a lower carbon footprint than either the average U.S. grid or the Asian market's grid mix used in the PCF study.

The carbon footprint of bottle-grade virgin PET is significantly greater than the rPET alternatives due to upstream impacts in manufacturing, primarily the reliance on fossil fuels. The impacts of baseline waste collection and disposal also increase this difference.

Las Vegas Polymer Center's More Efficient Process



Making an Impact

A company using 1 million pounds of rPET flake from Republic Services' Las Vegas Polymer Center in its beverage bottles could expect to see measurable environmental benefits:

AVOID CO₂ EMISSIONS

1,361,232 kg CO₂e
avoided compared to using virgin PET⁴

AVOID ENERGY CONSUMPTION

387,497 kWh
avoided compared to other U.S. rPET processes

SUPPORT THE CIRCULAR ECONOMY

1.42M lbs
of plastic diverted from landfills or incineration



4. Avoided emissions were estimated by quantifying the lifecycle GHG emissions of our process and subtracting them from the emissions associated with the production of Indian virgin PET, based on region-specific data and standardized methodologies.

Other Advantages

BOTTLE-GRADE PRODUCT

Republic Services' rPET flake is bottle-grade, unlike most rPET produced from mechanical recycling.

The majority of PET collected curbside in the U.S. is converted into low-grade rPET flake that's downcycled into polyester fiber for items such as clothing or carpet. While this is better than disposal through landfill or incineration, downcycled products have few options for further recycling⁵.

Republic Services' Polymer Centers produce bottle-grade rPET flake for use in beverage bottles and other food-grade applications. We're enabling true bottle-to-bottle circularity and helping fulfill voluntary commitments and regulatory requirements for post-consumer recycled content.

1. Single-use plastic bottles on store shelves
2. Plastic recycled in curbside bin
3. Recycling is collected and delivered to Republic Services' recycling facility
4. Recycling is sorted by material into bales
5. Bales of plastics delivered to Polymer Center
6. PET is shredded and washed to create rPET flake
7. Packaging manufacturers use rPET flake to make new beverage bottles



5. <https://www.gao.gov/products/gao-24-107486>

INTEGRATED SUPPLY CHAIN

Republic Services manages post-consumer recycled material, from domestic curbside collection of recyclable materials to production of clear rPET flake. Our nationwide collection operations allow us to aggregate recyclables at scale and deliver them to our Polymer Centers through our regional hub-and-spoke network. We maintain full chain of custody of recycled feedstock, beginning with collection from a customer's home or business to production of bottle-grade clear rPET flake.

In contrast, imported rPET offers no such transparency throughout the supply chain and has faced claims that some imported resin may not truly be recycled⁶. These claims may lead to verification requirements for rPET. State legislation has been introduced to require bottle manufacturers to report the country of origin for recycled plastic and verify post-consumer resin content through third-party certification⁷.

Domestic supply has the added benefit of durability and predictability, as it is not subject to the risks associated with complex international supply chains or frequent changes in trade policy.



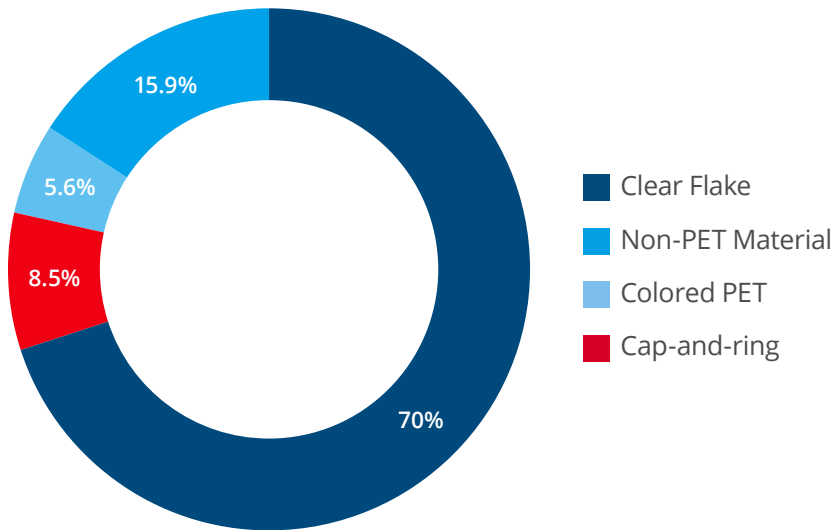
6. <https://resource-recycling.com/plastics/2025/07/16/california-lawmakers-look-to-quantify-pcr-imports/>

7. <https://www.plasticsnews.com/public-policy/california-bill-targets-recycled-plastic-imports-requires-pcr-origin-disclosure>

ENHANCED CIRCULARITY

In addition to producing bottle-grade clear rPET flake, our Polymer Centers are designed to recover and recycle non-PET material from the stream that would otherwise be disposed of through landfill or incineration.

As one of the nation's largest recyclers, Republic Services is committed to maximizing our recovery of inbound materials. At the Las Vegas Polymer Center, an average of 30% of what's processed is a recyclable material other than clear PET. This includes colored PET and bottle cap-and-ring, as well as other key materials such as polyolefins or aluminum, all of which is returned to the circular economy through Republic Services' recycling commodities network.



Methodology

Republic Services commissioned Sphera to conduct a cradle-to-gate comparative product carbon footprint (PCF) study of the recycled polyethylene terephthalate (rPET) flake produced at Republic's Las Vegas Polymer Center according to ISO 14067 (ISO, 2019) and Product Category Rule (PCR) 2010:16 on Plastics in Primary form (EPD, 2024).

The study compares Republic Services rPET with market-representative rPET and virgin PET derived from Sphera's Managed Life Cycle Content (MLC) database on a cradle-to-gate basis. It allows internal and external stakeholders to understand the relative performance of Republic Services' bottle-grade rPET to other rPET (mechanically recycled and typically non-bottle-grade) and to virgin PET in the market.

To support public communication, the report was critically reviewed as per ISO/TS 14071 (ISO, 2024). As a PCF, the study is limited to the assessment of greenhouse gases and therefore it is not an indicator for overall environmental performance.



SYSTEM BOUNDARY

Given the variety of PET applications across industry sectors, the chosen system boundary for PET pellets and flakes is cradle-to-gate.

The system boundaries of Republic Services' and representative market rPET include waste collection and sorting at a materials recovery facility, along with the recycling process and all inbound transportation. Pelletization is included in the comparisons to virgin PET.

For virgin PET, the boundaries cover the life cycle from raw material acquisition through manufacturing. This includes the assessment of all raw material inputs from the extraction and processing of natural resources, raw material supply, transport and manufacturing up to the point at which the finished products leave the factory gate. To ensure that the recycled and virgin PET product systems are equivalent, waste and recycling impacts are added to the virgin PET production in a system expansion approach.

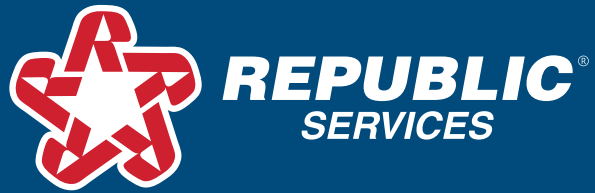
Energy consumption in all manufacturing or recycling stages in the form of electricity, steam, natural gas or others is considered within the scope of the study.

The full PCF report is available at RepublicServices.com/Sustainability



PRODUCT COMPARISON

The study considers Republic Services rPET production data from the Las Vegas Polymer Center for bottle-grade clear flake for operations from January 1, 2024, through July 31, 2024. The comparison includes representative rPET in the U.S. market, both produced in the U.S. and imported from Asia. The comparison also considers rPET in pellet form by adding a generic pelletization step and compares this to virgin PET from the U.S. and India.



Sustainability in Action

For more information on Republic Services' sustainability initiatives, visit RepublicServices.com/Sustainability.

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