

# Circular Product Design

examples from the automotive sector

## An EU-funded Project Aiming to Advancing Sustainable Recycling of ABS Plastics

The ABSolEU project, in which Trinseo is a partner, aims to advance the physical recycling of waste ABS plastic, producing clean and safe recyclates free from additives and contaminants, suitable for high-performance applications. The project aims to develop new analytical methods to ensure safety and quality, raise awareness about ABS waste composition, and support the use of recycled ABS in industry and consumer products. By the end of the project, it aims to establish a sustainable future for ABS plastics in Europe and beyond.

ABS is durable and designed for long-term use, with variable components tailored to specific applications like automotive parts, and electronics. ABS, as a thermoplastic, can theoretically be fully recycled. However, its varying grades and compositions, due to different component proportions, complicate the recycling process. Consequently, 85% of ABS ends up in landfills or incineration, with only a small amount mechanically recycled.

The ABSolEU project seeks to overcome these challenges by ensuring recycled ABS matches the quality of virgin material, facilitating wider reuse in various applications.

Source : <https://absoleu.univ-cotedazur.eu/>

## BASF and Citroën Oli: Electric Mobility with Recycled Materials

The Citroën Oli, a collaboration between Citroën and BASF, is an innovative concept car designed to showcase sustainable and efficient electric mobility. The concept aims to be reflected in future Citroën family electric vehicles. The Oli focuses on responsible design, using recycled and recyclable materials to create lighter and more durable parts, including some 3D-printed elements.

The vehicle is a lightweight, minimalist, cubic SUV that weighs only 1,000 kg, including a 40-kWh battery. Key design innovations include:

- a body made from recycled corrugated cardboard with a honeycomb structure and fiberglass reinforcement, making it stronger than steel while being half the weight of a conventional car body,
- interchangeable body parts to reduce costs and raw material use.
- flexible and recyclable TPU for most interior components,
- modular E-TPU floor covering,
- 3D-printed seat backs.

Goodyear's tyres for the Oli are almost entirely made from recycled materials.

Source: <https://plastics-themag.com/Citroen-Oli-a-think-tank-on-wheels>

## Borealis Innovates Recycled Plastics

Borealis introduces a glass-fiber reinforced polypropylene compound with 65% post-consumer recycled polymer content, for use in the Peugeot center console carriers. Developed with Plastivaloire and Stellantis, this innovation addresses forthcoming European regulations requiring recycled plastic in new vehicles. The advanced recycling technology transforms household waste into high-quality polymers, making it suitable for demanding automotive applications.

Source: <https://www.borealisgroup.com/news/borealis-introduces-glass-fiber-reinforced-pp-with-65-pcr-for-demanding-automotive-applications>

## Covestro's Circular Design for High-Performance Recycled Plastics

Covestro's circular design initiative focuses on creating polycarbonates with up to 72% recycled content through chemical recycling. Their RP series, part of the CQ portfolio, uses post-consumer waste as raw material, replacing fossil resources while maintaining high performance and quality. This approach supports regulatory compliance and customer demand for sustainable products, contributing to a circular economy and reducing plastic pollution. The series offers both high recycled content and a 25% option, facilitating a gradual transition to full circularity for various industries.

Source: Makrolon® RP: up to 72% recycled attributed share | Covestro

## Dow – Innovative Technologies for Sustainable Thermoplastics in Automotive Parts

Dow MobilityScience has designed new materials for various automotive parts that promote decarbonization, circularity, and advanced design while meeting performance, safety, and aesthetic standards. Technologies such as the ENGAGE™ 11000 Polyolefin Elastomer (POE) series and FUSABOND™ Functional Polymers are enabling the circular use of thermoplastics in automotive parts like bumpers and door panels. These innovations improve the quality of recycled polypropylene, addressing the loss of properties from recycling and ensuring compatibility with different polymers. This approach supports innovative product design and circularity, aiming to reduce plastic pollution without compromising on safety and lightweighting in automotive applications.

Source: <https://corporate.dow.com/en-us/news/press-releases/dow-to-showcase-mobilityscience.html>

## Evonik's Monomaterial Car Seat Prototype Paves the Way for Sustainable Design

The car seat prototype developed by Evonik showcases the benefits of a circular monomaterial product design. By using a single type of plastic such as VESTAMID, complexities in recycling are reduced because the entire product can potentially be recycled without needing to separate different materials. This approach addresses the challenges posed by multi-material products, where disassembly for recycling is difficult and costly and simplifies the recycling process, contributing to resource efficiency and waste minimization.

Source: <https://www.vestamid.com/en/in-the-car-seat-on-the-journey-to-monomaterials-178411.html>

## INEOS's Use of Mechanically Recycled ABS in Automotive Applications

INEOS uses mechanically recycled ABS for automotive applications, which is specifically designed for applications demanding high performance such as rear light housings. This material is chosen for its properties, including heat resistance, weldability, and suitability for metallisation and fixation processes. Derived from 30% post-consumer recycled ABS waste sourced from Waste Electrical and Electronic Equipment (WEEE), this approach reduces the carbon footprint by 23% compared to fossil-based ABS.

Source: <https://styrolution-eco.com/rear-light-housings-made-with.html>

## LyondellBasell Transforms Maritime Waste into Innovative Plastics

LyondellBasell is participating in a value chain collaboration to transform maritime waste into innovative plastics. Traditionally used as fibres, recycled maritime plastic is now being utilized for injection moulding with the new CirculenRecover PPC TRC 2179N grade. End-of-life fishing nets are collected, sorted, and processed into high-quality recyclate, which is compounded with virgin materials. This recyclate is used to produce visible interior trim parts for cars, enhancing sustainability and environmental responsibility. This initiative underscores LyondellBasell's commitment to innovation and sustainability in the automotive industry.

Source: LyondellBasell transforms maritime waste into innovative plastics - SAFETY4SEA