



CASE STUDY
- RECYCLING
& PRODUCTION
GERMANY

Recycling in the Automotive Industry: Audi's Sustainability Initiative In Focus

Industry

Automotive

Challenge

As part of their initiative to strengthen and expand their recycling efforts, luxury automotive brand Audi has been exploring the “chemical recycling of plastics from automotive manufacturing,” in ways that are both environmentally and financially viable. Their “Mission: Zero” project seeks to encourage minimal or closed-loop usage of plastics, as a step towards net-zero carbon emissions by 2025. The primary challenge was to achieve this without compromising automotive component quality

Solution

After identifying key areas where plastic use and wastage are maximum at most of their sites, Audi saw the potential for a closed-loop plastic usage cycle and purchased 3devo's full set of three machines. The Shr3d It shredder, Airid dryer and Composer 450 filament maker created an eco-system that could utilize unneeded plastics in a circular manner. This arrangement allowed Audi to evolve a plan for minimizing its usage of new plastics and bringing “Mission: Zero” closer to implementation.

Client



Impact

- A simple three-step solution has been established for closed-loop usage of plastics.
- Audi's A7 and A6 models have components that have been put together with 3D printed tools made from recycled plastic.
- The automotive brand has an experimentation tool that can be used to assess the recyclability of automotive plastics.
- The Composer 450 easily processes ABS, a key material used in the packaging of Audi components.

3devo

Meet the Client

Who is Audi?

German car manufacturer Audi has been a global leader in the automotive industry since its establishment in 1909. One of the most successful car makers in history, the company currently provides employment to over 90,000 people, and generates €55,000 billion in annual revenue (as of 2019).

Audi makes and sells a wide range of car models in a number of countries across the globe. It recognizes high performance, reliable build quality and progressive design as its key areas of focus.

Audi's vehicles are acclaimed for their luxurious yet sporty designs, and the brand for its bold yet scalable enhancements in vehicle design and production techniques.

Recently, Audi has ventured into the electric vehicle market with the E-Tron, showcasing its commitment to a more sustainable mode of transportation.

Audi's sustainability initiative extends beyond electric cars; the brand has also taken steps internally to introduce eco-conscious practices to its design and production departments.

One of the ways, as previously mentioned, is through the **“chemical recycling of plastics from automotive manufacturing.”**



The Problem

Unavoidable Plastic Usage

When identifying the key obstacles in dealing with the current environmental crisis, widespread plastic usage continues to be a challenge worldwide.

This is particularly true for industries like automotive, which are heavily dependent on plastic as a material source during design, prototyping and production.

Substituting plastic with more environment-friendly alternatives, without reducing component quality and safety, requires considerable time, research, and resources.

For Audi, widespread plastic usage across all its sites was often in direct conflict with their overall message of sustainability and future readiness.



The company was looking for a way to either completely stop the use of plastic, bring it to a minimum, or use the material in a circular manner.

This led them into an experimentation phase to test the recycling possibilities of the most commonly used plastics at their sites.



"The fact that the idea we worked on for so long is feasible and is helping protect the environment is incredibly motivating."

Volker Eitrich, Project Manager, Neckarsulm

The Solution

A Compact, user-friendly extruder that supports R&D

Audi's Neckarsulm site became the laboratory for the series of experiments that the automotive manufacturer undertook to explore the upcycling possibilities of commonly used plastics.

As 3D printing was already being used as a production technique for the components in their latest vehicles, exploring ways to leverage the same setup for recycling became the first course of action.

The complete 3devo setup consisting of shredding, drying and filament making machines was acquired by the Audi research team. They then proceeded to obtain plastic granulate by collecting packaging material and sorting them by plastic type to get them ready for filament making.



The Shr3d It could shred the plastics into small, processable and extrudable pieces with precision – an important requirement for preventing lumps in the final filament.

The next step involved getting the shredded pieces into the Airid dryer to remove moisture from them. This is another key requirement for obtaining usable filament.

Finally, the plastic pieces were successfully extruded into high-quality 3D printing filament via the Composer 450.



The Impact

A Scalable Model of Plastic and Recyclability

The full 3devo setup has helped Audi and its Neckarsulm research team experiment with their existing stock of used plastics to find a solution to their primary challenge. A material that is widely used in the packaging of Audi components is acrylonitrile Butadiene Styrene (ABS). ABS is also easily processable via 3devo machines.

Now that Audi has succeeded in recycling ABS into high-quality filament, a course has been charted for car companies to reduce not only their carbon footprint but also their production costs.

Audi's bold but meticulously planned approach and their usage of the 3devo machines is a first step towards the company trying to fully operationalize its recycling efforts and create a fully sustainable workflow. The recycled filament has already contributed components for some of the company's newer vehicles. In the years to come, other Audi sites across the world are also expected to follow the Neckarsulm model of closed-loop production.

About 3devo

3devo is a young high-tech company based in The Netherlands which develops accessible and high-quality products that fully cover the extrusion circle, with each product enhancing the quality of 3D printing filament.

3devo also assists businesses, educational facilities and research labs in transitioning to a more sustainable business model.

Staying focused on these goals, 3devo constantly improves its products and searches for ways to take polymer innovation to the next level.

Discover more at
www.3devo.com

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