Ramping up recycling of automotive plastics

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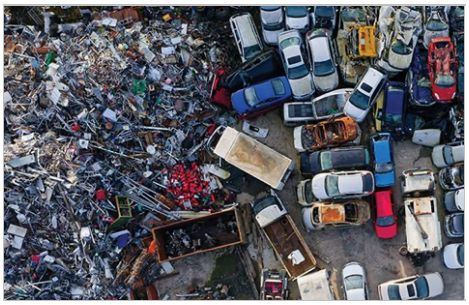

New legislation requires 30% of plastics from scrap cars to be recycled

Around 95% of retired passenger vehicles are processed for recycling every year

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Alejandro Navazas and Timo Unger discussing the challenges of automotive recycling at the 2023 Greener Manufacturing show in Cologne

Automotive recycling is the dismantling of vehicles for spare parts, or reuse in different applications. According to the Alliance for Automotive Innovation, cars are the most recycled consumer product, with around 95% of retired passenger vehicles processed for recycling every year.

From floor mats and fluids to aluminium and steel, approximately 86% of a car's material content is recycled, reused or used for energy recovery. Innovative technologies and vehicles advancements, like lithium-ion batteries for electric vehicles (EVs), require a coordinated and proactive approach from industry and other stakeholders to ensure end-of-life uses are properly managed.

Vehicle manufacturers rely on auto recyclers to remove parts that can be reused or remanufactured for use in other vehicles. These parts include components like engines, transmissions, doors, bumpers, starters, alternators and water pumps. Meanwhile, other parts, such as batteries, catalytic converters, tyres and some plastics,

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can be removed and recycled into new products. In recent years, car manufacturers have become more involved in the process, both from an end-of-life perspective and through designing for circularity from the start.

FOCUSING ON PLASTICS

In July 2023, the European Commission tabled new legislation covering vehicle design and end-of-life treatment, focusing on improving recycling and reuse of materials. According to the European recycling industry association (EuRIC), by volume, 50% of today's cars are made of plastic. This includes dashboards, bumpers, handles, buttons, casings, ceiling fabric, seats and seat belts, airbags, and so on.

Because plastics are lightweight and contribute to fuel efficiency, demand for the material in the automotive sector has continued to rise over the years, with the average car containing between 150-200kg of plastic. The European Commission's new legislation has been brought in to ensure that more of these plastics are recycled, with particular focus on improving recycling and reuse of materials. One of the key objectives of the legislation is that 25% of plastics used in new cars come from recycled materials, a quarter of which must originate from end-of-life vehicles. Overall, 30% of plastics from scrapped cars should be recycled, up from around 19% today.

According to Alejandro Navazas, **EuRIC's** Scientific and Policy Advisor: "Some leaders

in the auto market are already achieving 20% recycled content, mainly in exterior parts, and responsibility will lie with the manufacturers to boost supply by making cars more recyclable. The industry needs honest discussions, and discussions around remote recycling technology solutions to the processes that we use in terms of separation and recovery. The industry needs to work together to develop a fully integrated recycling process."

However, the legislation has posed some challenges to automotive manufacturers and recyclers, as Timo Unger, Senior Manager Sustainability and Environmental Affairs at Hyundai Motor Europe Technical Centre, explains: "I'm very happy to see that sustainability and recycling is growing in importance, both in the interests of customers and companies. But an interesting observation from my side is that now that the topic has become 'sexy' a lot of different parties are jumping in and end up going through the same learning curve as others did five years ago with regard to materials concepts designed for recycling and dismantling. So there are a lot of great ideas, but they are years behind in terms of learning. This is one of the challenges we see as a company."

Others in the car industry, such as automotive industry body Acea, have since expressed concern about the availability of suitable recyclable parts and materials in order to meet the European Commission's targets. According to Acea, the targets do not properly take into account, "imbalances

in the demand and supply of recycled materials and existing technology gaps." Additionally, some design features on cars that can make them harder to recycle – such as carbon fibre-reinforced plastic parts – have been made with lightweighting and emissions saving in mind.

"Designing with lightweighting characteristics delivers carbon reduction benefits, fits in with circularity and is done within a non-toxic environment," adds Unger. "This is something that is totally underestimated by legislators. Additionally, if there is not sufficient recycling material in a particular place, plastics will have to be transported from different manufacturing countries in order to manufacture parts of cars which then need to be exported again. So there would potentially be more transportation for the sake of complying with recycling, which is something we have to ask ourselves whether that's really efficient. Don't get me wrong, nobody in the industry is against the circular economy or against recycling plastic waste, but these considerations need to be taken into account."

GOOD NEWS FOR RECYCLERS

Generally, though the new regulations will likely be seen as an opportunity for those in the recycling industry to increase their focus on creating plastic grades that are suitable for various automotive industries. Those who are able to handle less commonly recycled engineering polymers, such as ABS, may benefit further, while the chemical recycling

industry may also be eyeing the legislation in a positive light. The ability to supply recycled polymers that are identical to 'virgin material' would remove any concerns regarding appearance, smell or functionality of such recyclates for the automotive sector, particularly if thermoset plastics are the focus.

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