

Media information

20 April 2023

From scrap to raw material: state-supported Car2Car project develops technologies to improve recycling of end-of-life vehicles.

- Consortium of science and industry led by the BMW Group is laying the foundations for a circular economy in automotive manufacturing.
- Wanted: innovative dismantling and intelligent sorting methods to boost the recovery rate for aluminium, steel, glass, copper and plastic.
- BMW Group intends to raise proportion of secondary material in vehicle production to 50 per cent while making increasing use of post-consumer materials.

Munich. The BMW Group is heading up a new project with state funding that explores the circular economy in automotive manufacturing. The company is joining forces with representatives from the recycling industry, commodity processors and the world of science to work on ways of improving the quality of secondary raw materials obtained from recycling end-of-life vehicles. With €6.4 million-worth of support from the Federal Ministry for Economic Affairs and Climate Action in Germany under its "New Vehicle and System Technologies" funding guidelines, the Car2Car project focuses on the materials aluminium, steel, glass, copper and plastic. In future, innovative dismantling and automated sorting methods should allow far greater quantities of the resources recovered from end-of-life vehicles to be made suitable for use in the production of new cars than has so far been the case. This project also includes an end-to-end evaluation of both the ecological and economic impacts of closed-loop recycling of the materials being investigated.

Michael Kellner, Parliamentary State Secretary at the Federal Ministry for Economic Affairs and Climate Action: "The successful transformation of vehicle manufacturers and suppliers is crucial for Germany as a business location. A stronger circular economy that conserves and reuses resources is a key step towards climate neutrality and safeguards supply chains at the same time. Innovation projects in this field are therefore of great importance. The funding from the Federal Ministry for Economic Affairs will help to make the automotive industry less dependent on raw material imports and ensure a long-term supply of raw materials for the economy, thereby boosting industrial value creation."

Uwe Köhler, Senior Vice President Development Body, Exterior Trim and Interior, BMW Group: "The BMW Group is focusing rigorously on technological innovations as a driver of greater sustainability in all areas of the value chain. The cumulative know-how of the various partners involved in this project could potentially unlock whole new ways of obtaining valuable secondary raw materials. This would make it possible to save natural resources and reduce carbon emissions when manufacturing our vehicles."

The BMW Group has set itself the target of increasing the proportion of secondary materials in its brands' new models from around 30 per cent at present to 50 per cent. To help achieve this, the recyclability of the materials used is already taken into account during the design process for new models. Rethinking how materials are recovered from vehicles at the end of their product life cycle is also of key importance. The raw materials obtained from recycling can only be used as part of a circular economy if they also satisfy the high standards of quality the BMW Group expects of materials for premium cars.

The BMW Group is supplying 500 end-of-life vehicles for the purposes of the project. A variety of models from its own portfolio – ranging from MINI to Rolls-Royce cars with combustion engines, plug-in hybrid systems and all-electric drive units – are undergoing recycling to produce a representative spectrum. Here, the consortium partners will be looking into potential ways of improving closed vehicle material flows. They are setting out to evaluate how limiting the flow of materials to vehicles affects the quality and purity of secondary raw materials.

Artificial intelligence as an enabler for an efficient circular economy.

The Car2Car consortium is working out the optimum balance between the dismantling process and post-shredder technologies from a qualitative, economic and ecological perspective – in order to retain as much of the value initially invested in the manufacturing of a car as possible. Today's recycling processes involve a high degree of manual effort and result in a loss of material purity, meaning they are only economically viable for a very small number of vehicle components. Car2Car aims to present sound recommendations for an innovative framework that will enable an efficient circular economy to deliver greater added value in future than is possible by following conventional, linear process chains.

Digital technology and artificial intelligence can be used to increasingly automate and speed up recycling processes that have been performed manually up to now. The dismantling process, for instance, can be partly or even highly automated with the help of robotics technology. The integration of systems for optical and AI-assisted detection and sorting of reusable materials in the post-shredder process brings about a significant improvement in the quality and purity of aluminium, steel, glass, copper and plastic materials.

In order to achieve this, the idea is to develop, among other things, sensor technology using AI-based materials detection and other spectroscopic methods (e.g. laser-induced plasma spectroscopy) that is capable of identifying different steel and aluminium alloys. In this way, it is possible to obtain raw materials with a far higher degree of purity. This increases the quantity of secondary raw materials suitable for the production of new cars, while also meaning that far less processing work is required to turn scrap into reusable raw materials. This applies to all materials.

BMW Group is actively involved in circular economy issues in a variety of ways.

As lead partner in the Car2Car project and the only participating carmaker, the BMW Group is driving forward the transformation to a circular economy. "We are facing up to our responsibilities and taking a holistic approach as we search for concrete solutions regarding the efficient use of resources," says Hilke Schaer, project manager at the BMW Group. "The interaction between players from the worlds of industry and science forms the basis for creating practical innovations within the Car2Car project that will lead to scalability potential for the future."

The BMW Group is also heading up another consortium project entitled Future Sustainable Car Materials (FSCM). Under its lead, research institutes and companies are working together on innovative process routes and material concepts for sustainable use of secondary materials and for reducing the carbon footprint of raw materials such as steel and aluminium. The use of secondary aluminium is a prime example of how consistent use of recycled material can cut greenhouse gas emissions.

The BMW Group is also carrying out important groundwork when it comes to the actual recycling of vehicles at the end of their service life. The company is the only carmaker to run its own recycling centre, which has been in operation since 1994. Up to 10,000 vehicles a year are processed at the Recycling and Dismantling Centre in Unterschleißheim near Munich. As well as being applied internally, the findings and solutions that emerge from this process are also made accessible to all players in the recycling industry.

The following consortium partners are participating in the Car2Car project:

BMW AG

TU Bergakademie Freiberg, Institute of Mechanical Process Engineering and Mineral Processing

TU Bergakademie Freiberg, Institute of Iron and Steel Technology

TU Bergakademie Freiberg, Institute of Glass and Glass Technology

Helmholtz Institute Freiberg for Resource Technology at HZDR

Technical University of Munich, Professorial Chair of Circular Economy

Technical University of Munich, Chair of Materials Handling, Material Flow, Logistics

Technical University of Munich, Institute for Machine Tools and Industrial Management

Scholz Recycling GmbH

STEINERT UniSort GmbH

thyssenkrupp Steel Europe AG

Salzgitter Mannesmann Forschung GmbH

Aurubis AG

Novelis Deutschland GmbH

OETINGER Aluminium GmbH

Pilkington Automotive Deutschland GmbH

Date 20 April 2023

Subject From scrap to raw material: state-supported Car2Car project develops technologies to improve recycling of end-of-life vehicles.

Page 5

In the event of enquiries please contact:

BMW Group, Corporate Communications

Carolin Seidel, Press Spokesperson Innovation and Technology

E-mail: Carolin.Seidel@bmwgroup.com, telephone: +49 151 601 90340

Oliver Gschwandtner, Press Spokesperson Circular Economy

E-mail: oliver.gschwandtner@bmwgroup.com; telephone: +49 151 601 20033

Internet: www.press.bmwgroup.com

E-mail: presse@bmw.de

The BMW Group

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises over 30 production sites worldwide; the company has a global sales network in more than 140 countries.

In 2022, the BMW Group sold nearly 2.4 million passenger vehicles and more than 202,000 motorcycles worldwide. The profit before tax in the financial year 2022 was € 23.5 billion on revenues amounting to € 142.6 billion. As of 31 December 2022, the BMW Group had a workforce of 149,475 employees.

The success of the BMW Group has always been based on long-term thinking and responsible action. The company set the course for the future at an early stage and consistently makes sustainability and efficient resource management central to its strategic direction, from the supply chain through production to the end of the use phase of all products.

www.bmwgroup.com

Facebook: <http://www.facebook.com/BMWGroup>

Twitter: <http://twitter.com/BMWGroup>

YouTube: <http://www.youtube.com/BMWGroupView>

Instagram: <https://www.instagram.com/bmwgroup>

LinkedIn: <https://www.linkedin.com/company/bmw-group/>