PRESS RELEASE

ARRK Engineering makes key contributions to resource efficiency in the CO2OPERATE project

In the CO2OPERATE research project, ARRK Engineering GmbH is working together with partners from industry and science to make the production and operation of city buses and coaches more environmentally friendly. The aim of the project is to reduce energy and resource consumption in these commercial vehicles by using additively manufactured metal components. The focus is on lightweight construction through optimized production, recycling management and the systematic evaluation of environmental impacts over the entire product life cycle.

Munich, April 2025 – ARRK Sustainability Consulting - a service of ARRK Engineering GmbH - is responsible in particular for carrying out predictive life cycle analyses (LCA) within the project. This enables the environmental impact of components to be assessed in the early development phase. The majority of these impacts arise in the concept and design phase - the potential for savings when applying eco-design criteria is correspondingly high. ARRK Sustainability Consulting therefore helps to systematically identify this potential and take it into account when designing components.

Another focus is on evaluating the so-called R-strategies of the circular economy. These are approaches such as reuse, repair and recycling, which are intended to extend the useful life of components and close material cycles. Where appropriate, circular business models can be derived from this.

Lightweight construction with a measurable effect and additive manufacturing in practice

Saving vehicle weight is a key objective of the project. A reduction of 100 kilograms, for example, can save around 2,100 kWh of energy over the service life of a bus. To this end, ARRK Sustainability Consulting is working with the project partners to investigate various lightweight construction options and analyze their ecological and economic impact.

CO2OPERATE is testing the use of additive manufacturing technologies such as Laser Powder Bed Fusion (LPBF) and Laser Metal Deposition (LMD) on several selected components. ARRK Sustainability Consulting supports the evaluation of these processes through life cycle assessments and also uses sensor data to record the use of materials and energy in the manufacturing process. The aim is to create reliable statements for possible applications in series production.

The project is funded by the Federal Ministry of Economics and Climate Protection (BMWK). In addition to ARRK Engineering, the consortium includes Daimler Buses GmbH, the Institute for Production and Information Technology (IPI) at Kempten University of Applied Sciences and the Chair of Product Development at Saarland University. Associated partners include TRUMPF Laser- und Systemtechnik SE, ARTEKA e.K. and thyssenkrupp Schulte GmbH.

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